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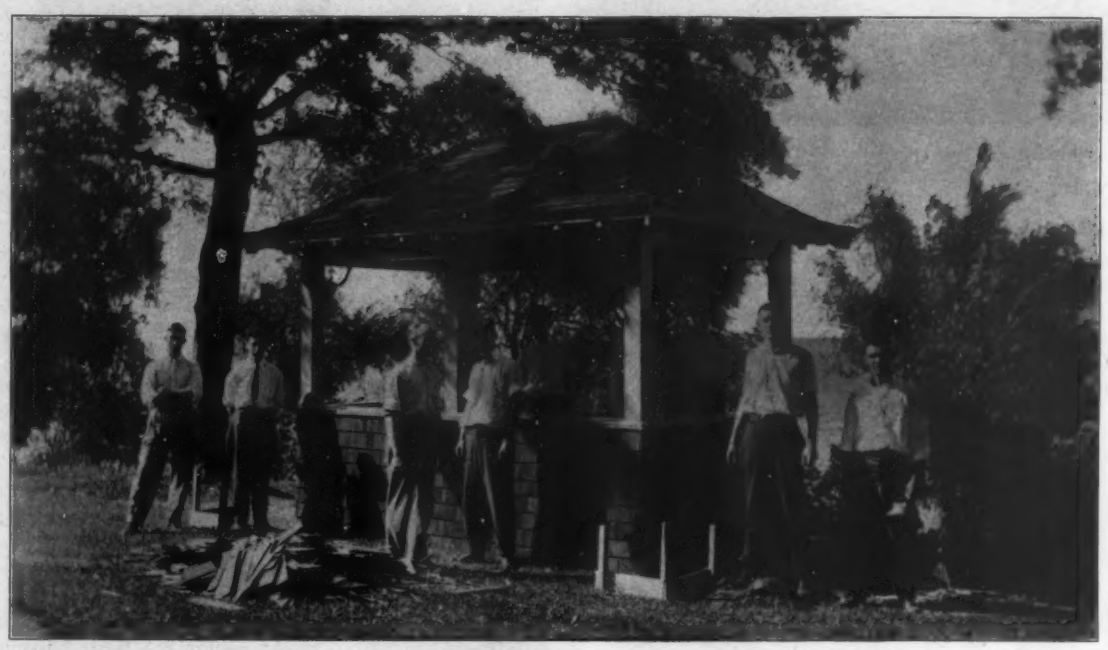

THE PRESENT DAY OPPORTUNITY IN MANUAL AND INDUSTRIAL ARTS

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SINCE the introduction of Manual Arts in the public schools of this country there have been many attempts to change the character of drawing and shopwork which has been done under the name of manual training. These efforts have been the result of periodical waves of public opinion formed usually by the wide circulation given to some new theory of educational practice.

Nevertheless, we still see strong evidence in practically all manual arts courses, which we are wont to call American, of the original types of manual training—Russian and Sloyd. In fact, in content, American courses are little more than combinations of the old Russian and Sloyd courses. Sometimes the elements of the first of these early courses are given prominence and we have a predominance of exercise work. Again, some of the leading features of the second are chiefly emphasized and the result is a few or no exercises, as such, but a course made up of a more or less formal set of models.

Whatever has been the new educational theory with regard to the conduct of American manual arts, with rare exceptions have courses differed in fundamentals from those which are prominent in the two original types of courses. The proper use of tools in making construction details, which comes from the Russian type of course; and the making of useful articles, a prominent element in all Sloyd courses, have been basic underlying principles in nearly all American courses.

The result of applying any new educational theory, or a new interpretation of an old educational theory to the teaching of industrial work has been, not so much to change courses internally as to produce a changed external effect. For example, educational theory as applied to teaching has been injected into the manual-arts division of teaching in times past to emphasize certain external conditions. These conditions have been suggested usually by the name of the particular theory in question as for example: (1) The theory of recapitulation, (2) The theory of social education, (3) The theory of social-industrial education and (4) The theory of industrial education.

Under (1) the manual arts were taught with much attention given to the selection and preparation of all

Why not have individuals make full-sized framing details?

materials of construction from the raw to the finished stage. Under (2) articles were made largely to satisfy the social demands of the individual maker, his family or the community in which he lived. Under (3) the articles were selected with reference to their value as a social means but preference was given to the particular one which was an instrument in, or a product of, industrial life. Each article made therefore, represented, in a way, man's activity in industry. Under (4) which affects our present practice, the article of industrial significance is chosen and made as nearly as possible as it would be in a commercial shop. Thus the article made represents not only man's activity in industry but also the current commercial practice in some particular industrial occupation.

As has been suggested, while the emphasis *as regards purpose* has shifted from one point to another, the two previously mentioned *fundamental, integral elements* in early manual-arts courses have remained fairly constant factors in all succeeding courses. These are: (1) The best possible use of tools and (2) The making of articles of use.

Now these two time-tried features in manual arts are the same two that we might expect to find in the industrial practice involved in vocational education. In fact, do they not constitute the chief factors in determining the vocational value of any industrial process?

Take the work of the machinist for example. It is of vocational value to the machinist because society demands it. But to any particular individual machinist it has vocational value depending upon the individual's ability to make, in a workmanlike manner, what society demands.

One's vocation is the most useful factor in his existence and in one's vocation he is sure to use the required tools in the most efficient manner possible. Consequently, vocational education, so far as drawing and shopwork are concerned in the public schools, should mean two things:

(1) The conduct of these lines of work in accordance with the best known practice to teach the proper use of tools, and

(2) To select, with discrimination, articles of vocational significance and, within the limitations of individual pupil ability and school facilities, to have these articles made according to approved commercial methods which are developmental educationally.

To do the first of these two things we must have: carefully planned demonstrations, close observation and consequent individual guidance in the use of tools by the instructor, the highest possible standard of tool technique, the selection of projects to develop in the best way for each pupil the use of tools in one or more lines of mechanical work, and the use of all supplementary material and devices to create an "industrial intelligence."

To do the second of these two things: We must study industrial processes, secure industrial shop experience, get the co-operation of industrial workers and, thru sane vocational guidance, help choose at the proper time for any particular individual, the industrial occupation which he is most interested in and most likely to follow.

These are represented by the fundamental woodworking and metal working trades and special occupations within the industries which make use of such materials as paper, textiles, clay and concrete.

In the last analysis, we of the public schools, must take cognizance of the fact that the manual arts are an outgrowth of one of a few fundamental activities. They are a natural result of attempting to direct, educationally, a child's instinct to manipulate and construct. This is the abstract and theoretical fact to be considered. In much of our manual training of the past, this fact has been the principal and sometimes the only fact taken into consideration by the teacher. But there is another and equally important fact with which we are confronted today, viz.: that, within the field of manual arts outside of the school, there are numerous specialized activities or "subjects" which serve as the means of livelihood for the great proportion of men and women in every community. The big problem in the manual arts in education today is to so recognize and take advantage of these two facts that all manual and industrial work shall react upon the individual to develop him broadly as a future citizen in an industrial age, and as a specialist in some particular industrial occupation if his choice of an occupation falls within the industrial group. This is not a special-school problem. It is a public-school problem.

However, the practice of the past is the danger of the present, viz.: to so organize our work that we shall have a few selected and prescribed subjects for which we make stereotyped courses of study. This formalizing influence has been evidenced in the past by too many lifeless courses in drawing and shopwork. The "educational sequence," whatever that may mean, has been the idea back of set courses in mechanical drawing made up usually of plates in line exercises, geometrical problems, theoretical projections, shades and shadows and, least and last of all, some real working drawings. It must have been the idea, if indeed there was one, back of what we now almost sneeringly call the "salt-box, tie-rack, and coat-hanger" course in woodworking.

In the future, this formalizing influence may be evidenced in mechanical drawing of the "shop drawing"

type—rough sketches made by the pupil without the teacher's direction—and which seldom serve as a graphical representation of an object either in the form of properly made freehand or mechanical drawings. It may, also, appear in the form of "copy" drawing where tracings or pencil duplicates are made of drawings which the pupil does not understand.

In shopwork, too, in order to get entirely away from the commonly condemned practice of the past, we may find that much that was formerly common in the apprenticeship method of rearing young mechanics will obtain, viz.: to do one thing on a production job until the pupil can do it almost if not quite automatically, and at the same time, so well that we shall *forget him in our ambition to turn out quantities* of a particular finished product.

This, of course, is a speculation—it is hypothetical—and yet in some of our newly organized schools, established under recent laws which were passed to make more perfect the education of our youth industrially, we find these conditions to exist. It is also true that in some of these newly organized schools the most extreme practice of the early Russian course in manual training is followed. Instead of doing the "real job" which we have been told the "industrial school" should do, some of these schools are doing manual-training exercise stunts both in mechanical drawing and shopwork which representative manual-arts teachers for the past ten years or more have tabooed.

Now what does all this mean? Among other things it means (1) that both in our public-school practice and in the new industrial-school practice there is still recognized the value of the fundamentals previously spoken of which is our inheritance of the past; (2) that, as yet, with this new emphasis upon the industrial, in the interpretation of educational practice there is an uncertainty as to how to apply the theory, (The theory of industrial education is one thing, and the practical instruction, as yet, is a very different thing); (3) that we have not, as yet, discriminated between what the manual-arts departments in the regular public schools may and should do, and what the newly organized industrial school may and should do; (4) that, as yet, the average newly organized industrial school is *not doing* much, if anything, which at least some public-school manual-arts departments in the past have done and which all public-school manual-arts departments of the present and future may and should do.

When the educators of today wake up to the full appreciation of their opportunities and take advantage of them, there will be small necessity for the special industrial school of whatever type, except for those who are mature enough to specialize in some one vocation.

As previously stated the big problem of the manual arts, including both the regular and special public-school departments, is to so balance theory with practice, (practice for cultural or general educational ends and practice of an industrial character for vocational ends), the fixed problem in a course of study with the "real job" type of work, and a careful study concerning tool practice a fair consideration of the great mass of facts

The majority of woodworking mechanics are engaged in carpentry and framing.

concerning tools, materials and industrial methods, etc., etc., that, as Professor Black of the University of Indiana puts it: "manual arts will be raised to a higher power."

The teachers of manual arts, with all other educators, are greatly indebted to the advocates of industrial education both for the criticism, sometimes unjust, of manual training and for the constructive suggestions that have been given for improving industrial work. They should realize by this time that it is within the province of the manual-arts departments in the public schools to do much that is now being done under the name of industrial education, particularly that which is of *general and pre-vocational character.* They should, at the same time, recognize the fact that the special industrial school and trade school are a necessity and they should not only welcome them but they should support them. *It is a recognition of spheres of action and a co-operation of forces that is needed to solve the manual and industrial-arts problem of today.*

Vocational work which is "manual training raised to a higher power" should be done in a regular public school. Industrial work of a specialized character can best be done in a special school designed for those who have chosen their life work. This work must be taught by masters in the specialized field. Does this not mean that public-school manual-arts departments should take care of the "differentiated" field and that the industrial and trade school should be responsible for the "specialized" field? You answer, "Yes," perhaps, but at once say, "How can we do it in the time commonly allowed for manual arts?"

It is too true that the manual-arts work in public schools needs more time. Certainly the plea which Professor C. A. Bennett of Peoria, Illinois, and others are making for two-and-one-half hours in the upper grammar grades and five hours in the high school *each week* is one which we would all earnestly make. Is not the thing required, however, the proof of manual arts as a means of vocational education as well as in general education? And must we not attempt to procure this by doing the vocationally demanded piece of work in differentiated courses before the desired and much needed additional time will be given?

Few deny the cultural value of manual training but many say that it has little or no vocational value. In-

In the country district shall we not consider the value of bird houses, etc.?

stead of teaching formal woodwork, from the sixth grade to the junior year of the high school, suppose we introduce some metal work and concrete work in the upper grammar grades. Also, in the present exclusive woodwork, why not start with a semi-large type of construction and make among other things some crates, slat waste baskets, boxes and small bins, tressels and small step ladders? Or, if we are in the country district, shall we not consider the value, both general and special in making feeders, troughs, egg and grain testers, hatchers, bird and chicken houses, etc.

In this connection may it also be said, that we be so unorthodox as to become heretics if we should forget some of the formal sheets, which bye-and-bye will be the skeleton of the past, and instead of them have a progressive course in working drawings? Every drawing in such a course may represent the best kind of theory and practice introduced at the proper time to account for all the value of the line, letter and geometrical drawing sheets of the older type of course; and every one, also, will represent a "business letter to a mechanic" about some object with which the pupil is familiar—possibly something which he is making in the shop.

In this connection, may it also be said, that we shall show our ability to take advantage of the lessons of commercial practice if we will establish a good pencil technique in drawing before we begin inking. Few original sheets in the commercial drafting room are inked; they are, however, well penciled. If they are to be duplicated they are traced and blueprinted.

Considering the late grammar-grade period or early high-school period, now, may we ask for a good argument in favor of some of the manual-arts work that is very generally done in the upper grades? What is it? Often it is little more than a repetition of similar work previously done. In the shop we sometimes make joints over again so that we may make them better, or, if we make projects, they are little different from those made in an earlier grade and seldom made to emphasize "group" or "community" work such as we see in any commercial shop. The individual craft method is continued. Would there be anything lost, culturally, if we turned a single piece or many similar pieces of furniture out on the "production basis," keeping account of stock, time and per capita cost as is done in the commercial shop? If not, then such methods would mean all gain and no loss for they represent vocational standards. And would it not be well, also, to recognize the fact that in woodwork the majority of our woodworking mechanics are engaged in carpentry and framing instead of furniture and cabinetwork? Why not have individuals make some full-sized stock framing details in the shop and later, with the whole class, construct a shed, a garage or a small cottage? We can find excuses for not doing these things but the fact remains that they are being done and under public-school conditions, also.

In the mechanical drawing, too, in the high school, do we recognize the fact that architectural drawing has many values, if not all, equal to those of advanced mechanical and machine drawing? What good reason is there for waiting until our classes dwindle down to a handful in the junior or senior year before we introduce this subject?

These are only a few of the many suggestions upon which manual and industrial-arts teachers may well reflect. This article is not written for the purpose of outlining definitely courses of study or to determine positively where this, that, or the other thing should be done but to urge us, one and all, individually and collectively, administrators as well as teachers, to study the problem of teaching industrial work in schools. May we recognize the place and the work of the special school either of the continuation or of the all-day industrial or trade type, and may we be duly impressed with the force of argument for it! But may we also know, as we should after thirty-five years' experience with public-school manual-arts departments multiplying in number year by year, that the end is not yet!

We, somehow, must see the dawn of a new day, even now upon us, when, together with our colleagues in other branches of school work, we shall do a more vital thing in our subject—manual arts. We must help decrease the size of the sometimes called "educational scrap heap." Yes, and more than this: We must help those who are in the scrap heap—a public-school waste—to become efficient industrial workers and citizens. It is quite as much a public-school job as it is a special-school job.

Only a few years ago manual arts was regarded principally as a means in general education. Now the vocational side is emphasized. Having a double purpose, we should strive to secure a two-fold result: general educational benefit for all and special vocational benefit for those who would elect manual arts for vocational ends.

There is a demand for manual-arts teachers with a vision—one which properly relates the cultural and vocational, which combine individual freedom of thought and action with sane instructional restriction, which means a great human *activity* to be organized and controlled rather than a *subject* to be narrowly taught. We have had preached to us the doctrine of standardization and some of us have intrepreted this to mean uniformity. Uniformity means nonadjustment and ultimate stagnation. We need standardization if this means a thoro knowledge of the technique of our subject—the

growth of a human instinct to manipulate and construct —both as regards its best practice and as regards the best methods of developing and teaching it. Just now, however, in the face of a great transitional change in the industrial arts we need constancy of purpose, stability in our faith that public-school manual-arts has been, is, and will be a general educational means but that it may be and should be vocational as well. We need, quite as much as anything else, the power to adjust our work to individual and community needs.

If we will so adjust we shall help the cause of industrial education by helping the cause of public-school manual arts, for we shall better prepare those who will go to the special school for the work which should legitimately be done there. We shall, also, prevent an early specilization for the many by giving them a "trying-out" process thru a differentiation of practical work and allied academic studies to better prepare them for a choice of an occupation.

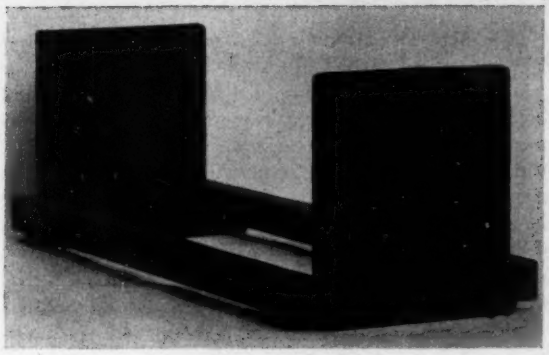
In this industrial-education agitation we have usually been frank with one another but have we always been fair? Have we always said and done the things which mean: *the boy and girl first and the school afterwards?* May we not stop quibbling about details and, by frankly facing the issue, admit that regular public-school manual arts can be vocational without educational loss? And may we not likewise admit that regular public-school manual arts cannot do all that is demanded in industrial education?

The special school is needed for there are now, and there always will be, young people who are wage workers in specialized industry and who need more schooling. And there will be in the future, let us hope, those who have had a chance in the regular public schools to get the *vocational emphasis in academic studies and a variety of practice in industrial work,* and who have decided, because of this opportunity, for some special industrial occupation.

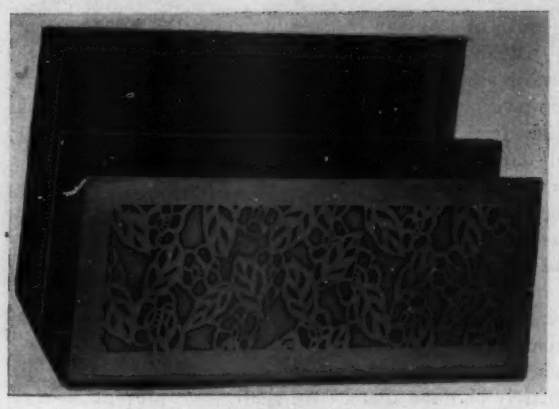
For those in these two classes, the regular public school is no longer a training ground but the special industrial school, operated under the advice of men in industry, and having industrial specialists on its teaching force, is their need and should be their possession.

The regular public-school manual and industrial-arts department can, and should provide for a variety of industrial work, taught with due regard to good commercial practice. *The special public-school manual and industrial-arts department* must provide for the present and near future specialist in industry.

Examples of Concrete Work for the Upper Grades.



The Book Rack is Simple in Treatment.



The Letter File is Attractive.

How to Make an Etched Brass Desk Set

Martha Feller King

THE project of developing a desk set in etched brass is a very simple one; necessitating great care in the work, and attention to detail, rather than much skill and elaborate equipment. To prove this, the desk set of which photographs are shown, was made on holidays and in odd minutes after business hours, and was the first large piece of etching attempted.

Very little equipment is necessary for this work. The following list, given with approximate prices, will prove quite sufficient:

Anvil (about a one-pound size)	$0.75
Flat Nose Pliers	.25
Vise (1¾" jaws)	.50
Tinners' Hand Shears	.50
Rawhide Hammer	.25
Blow Pipe	.10
Charcoal Soldering Block	.10
Soldering Iron (small)	.25
File	.10
Metal Drill (hand)	.85
	$3.65

In a schoolroom having no equipment, rough benches or shelves could be constructed from packing boxes, and would make very practical work benches upon which the anvil and vise could be fastened.

Brass is prepared for the market in sheets, and comes in twelve-, fourteen- and eighteen-inch widths. As much is measured and cut off as may be desired, and the piece is then weighed and sold by the pound.

The thickness of the metal is known as the gauge; in this case a No. 20 gauge was used.

After the brass is purchased, it should be unrolled and hammered flat with a rawhide mallet; then cleaned by rubbing thoroly with a wet rag dipped in powdered pumice stone.

The pattern may then be traced on the brass. A blunt-pointed embroidery needle hammered thru a cork makes a good sharp-pointed instrument with which to scratch the design onto the brass.

It is well to leave the sections of metal uncut until the parts are ready to put together, because there is less danger of marring the work with tool marks, and often much time can be saved by grouping small sections on the same strip of metal and etching them at the same time.

After the patterns are planned, the design is traced upon the metal. If the workman has had Art training and can plan his own design, so much the better; if not, Japanese stencils supply very attractive designs which are well adapted to problems in etched metal.

When the design is traced with the scratched line, it is ready to be carefully painted over with asphaltum varnish. This varnish protects the design from the action of the acid in the bath, while the parts unprotected by the varnish are eaten as deeply as may be desired. It is necessary to paint very carefully, as the design comes from the bath etched just as it was painted. There must be no little parts left uncovered for the acid to creep in and eat, and care must be taken to see that the edges are even and clean cut.

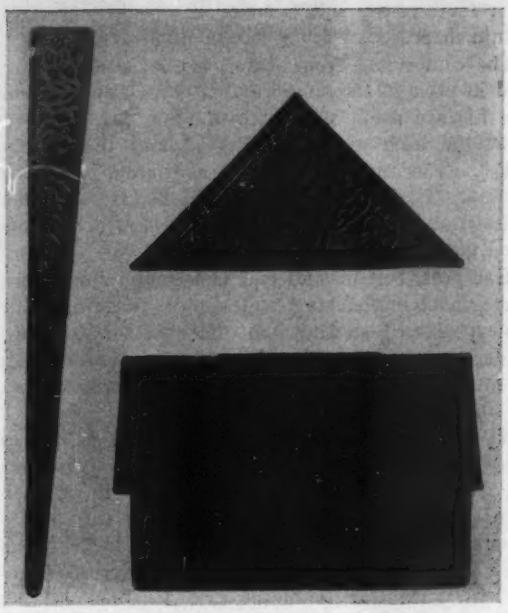
The back and all unused parts of the metal must be painted, for no part can be left unprotected except where the action of the acid is desired.

If the varnish thickens too much, add sparingly a little turpentine. Use a pointed camel's hair brush, and look over the work critically before submitting it to the action of the acid.

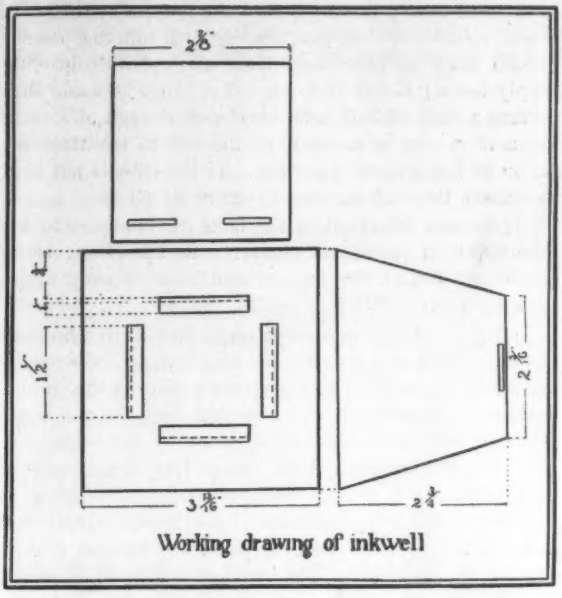
Allow the varnish to dry thoroly. When it no longer feels "tacky" to the fingers, hold the metal with the pliers and pass it once or twice over a lighted gas jet.

The metal is now ready for the acid bath. For the etching fluid, chloride of iron, used full strength, is better than other acids because it varies less in strength.

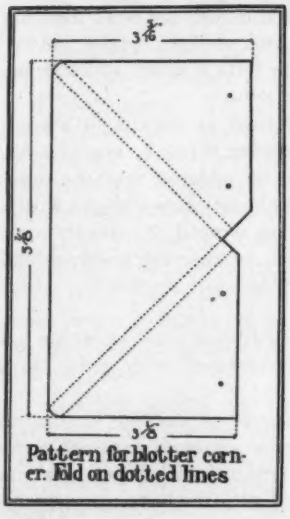
The acid bath should be prepared in an etching tub. This consists of a wooden box with sides three or four inches high, made waterproof, and coated several times with asphaltum varnish. Each coat of varnish should



Paper Knife, Blotting Pad Corner and Stamp Box.



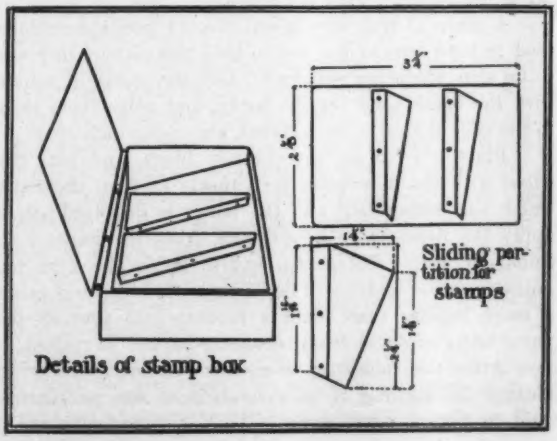
Working drawing of inkwell



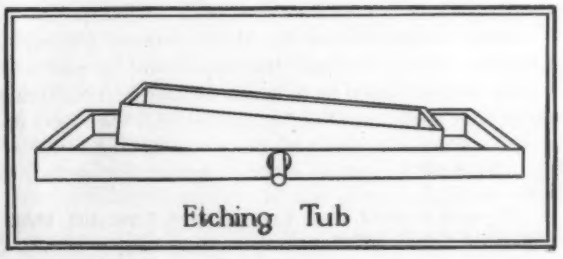
Pattern for blotter corner. Fold on dotted lines

The Inkwell Displays the beauty of the Design.

The Calendar is a simple project upon which to experiment.



Details of stamp box



Etching Tub

be allowed to dry thoroly before the next is applied. It is well to dust the last coat heavily with topping powder (which may be purchased from any photo-engraving supply house) before it dries. If a frame is made supporting a strip of half-inch dowel rod, enough of a rocking motion can be secured for the tub to facilitate the action of the acid on the metal. If the bath is not kept in motion, the acid is much slower in its action.

Immerse the metal in the bath for from six to ten minutes, then remove the metal with the pliers, being careful to protect the fingers, and rinse thoroly under running water.

Dry carefully, and when dry, dust with Dragon's Blood.* This is a red powder which is not affected by the action of the acid, and eliminates entirely the trouble that most amateurs have of seeing their designs come from the bath with edges under-eaten by the acid.

Dust the Dragon's Blood on carefully with a camel's hair brush, first with a vertical motion, changing to horizontal and oblique strokes of the brush. Great care must be taken to see that the powder is banked thoroly against all the edges. The metal should then be passed quickly over the lighted gas jet, so that the heat may melt the powder, which will darken in color as it heats. Examine the metal to see that no powder remains in specks or spots. If these spots exist, they should be scratched away before the metal is returned to the acid bath. Allow a second bite, repeat the drying and dusting operations, and return for the third bite. The time allowed for a bite and the number of bites given are determined solely by the depth to which it may be desired to have the metal eaten.

When the design has been eaten sufficiently, scrub the metal thoroly with benzole, and dry off with alcohol.

Carefully cut out the pieces as originally marked, with the tinner's shears. All edges should be carefully filed and surfaces well polished with a wet rag and powdered pumice stone.

In developing this work as a class project, a teacher would, of course, plan the work so that involved processes are introduced after the etching process has been mastered.

The calendar is the most simple problem with which to start. The two-inch square of etched metal is tacked in place upon a 3½"x5¾" block of rosewood, by brass brads inserted thru holes drilled in the corners of the brass, ⅛" from the edges. A ¼" strip of brass, to hold the calendar pad, is secured ½" below, by the same method.

The bookrack is constructed in the same way. The metal ends measure 4¼"x5¼" with a ½" margin left along all edges.

The construction of the blotter corners is simple. After the design is etched, the laps should be bent over a piece of metal equal in thickness to that of the blotting pad. The holes may then be drilled and the rivets inserted. Place the heads of the rivets on the inside of the folded blotter corner, insert a smooth iron surface to form a solid resist, and hammer the projecting rivet ends into shape.

The center and front leaves of the letter file are riveted in place in the same way. The back and bottom of the file are made of a piece of brass 7"x9" folded so that the back measures 7"x4¼" and the bottom 7"x4¾". The center and front leaves are 7"x3", with a ¼" lap. They are held in place by five rivets, which are placed at regular intervals thru holes drilled in the lap and the bottom.

Hat pins, belt buckles and photograph frames are projects involving etching and simple soldering. To the inexperienced student, the difficulties of the steps in soldering involved in the ink well and stamp box will seem much less if experience in soldering is gained in these simpler construction problems.

The stamp box requires a strip of metal as wide as the depth of the box and as long as the sum of the four sides, in this case 1¼"x10½". The length of each side, 3¼" and 2", is measured off on this strip and a line scratched at right angles to the edge. The strip is then placed over an anvil and, with a rawhide hammer, bent at right angles at the scratched lines, making three corners, and leaving the ends to meet at the fourth corner where they are to be soldered.

The edges that form the corner are next filed up, keeping all edges straight and at right angles. After this, the edges are beveled, to form a miter, which, when soldered, makes an accurate joint.

Several points must be fixed in the student's mind regarding the process of soldering before he begins work.

All pieces of metal to be soldered must be absolutely clean. The joints should be scraped bright with a sharp-edged tool. After being scraped, the fingers must be kept away from the joint, because the moisture and oil from the skin, on the metal, will prevent the solder from running.

The solder and edges are dipped in borax, which has been ground to a creamy consistency, with water, on a clean slab.

Silver solder gauge No. 20 is the best to use on brass of this gauge. Cut the solder into pieces about 1-16" square, and drop them into the borax solution. Coat the edges to be soldered with the borax, being careful to use no more than is necessary.

A piece of iron wire about No. 24 gauge should be used to bind around the box to hold the corners in place while they are being soldered. Lift the pieces of solder with the brush used for the borax, and place them next to the edge that is to be soldered, about one inch apart.

Place the box on the charcoal block, and heat the edges with the blow-pipe, very slowly at first, until the water has evaporated, and the borax is dissolved; then apply the flame more directly, to bring the joints to a soldering heat. Be careful not to apply the heat too quickly, or the solder will be thrown off, and avoid using a more intense heat than is necessary to prevent the parts being soldered from becoming burned or melted.

After the soldering is completed, the box may be cleaned by dipping it in a solution of one part nitric acid to fifteen parts water. This is technically called

*Dragon's Blood may be purchased from any photo-engraving supply house.

the pickle bath. When it is removed, the box should be rinsed thoroly under running water.

The bottom of the box is not yet soldered in place, but the box should first be placed over the anvil and squared. File the bottom edges square and at right angles to the sides. Cut the strip for the bottom large enough to project 1-16″ on each side.

Bind the box with wire, as before, to hold the bottom in place. Care must be taken not to melt the soldered corner. To avoid this, keep the flame away from the corner until the rest of the solder has run, applying it to the corner last, and only for a fraction of a minute. After the bottom is soldered the box is again pickled, and the edges filed square. The 1-16″ edge that projected is filed flush with the sides of the box.

The hinges are made of hollow wire tubing, cut and soldered in place; two pieces on the edge of the lid, and one fitted and soldered on the upper edge of the back. A brass wire is then forced thru the tubing, cut the desired length, and the ends flattened slightly to hold them in place.

The two partitions on the sliding shelf, which is separate, are riveted in place.

The making of the ink well follows the same processes as those involved in the stamp box. All dimensions are given in the working drawing. The 1½″x¼″ strips on the bottom are bent as shown and soldered in place to hold the ink bottle.

After the pieces are completed, the edges filed and the surfaces well polished with powdered pumice stone, a lacquer of banana oil should be applied with a brush to make the polish permanent. If the odor of the oil proves too unpleasant, a colorless shellac may be substituted.

BRICKLAYING: ITS GENERAL SCOPE AND FUNDAMENTAL PRINCIPLES

Wm. T. Gohn, Instructor in Brick and Cement, Trade School of Stout Institute, Menomonie, Wis.

Bricklaying is a form of masonry. It has flourished thruout the ages since the early days of the Egyptians and Babylonians. But these people caring for Nature's own product (the quarried heart of the hills) regarded bricklaying as a subordinate art. To the Romans, a practical and economical people, we are indebted for the development of this type of building construction.

The invasion of Northern Europe by the Romans was responsible for carrying the art of bricklaying, and of many other arts, into this section of the Old World. In these countries brickwork took on characteristics peculiar to the different peoples. In short, it portrayed their temperaments.

English history may be written in brick architecture; for, from the time of the Roman wall, surrounding London in the early ages, to the immediate present, brick has been the staple building material. The practical advantages and aesthetic possibilities of brickwork commend it where permanence and character are desired even in the present age of steel and concrete.

In the United States, brick architecture is comparatively new with the exception of the Colonial period, which in reality was only an echo of the Georgian period in the mother country. Altho new, it has far exceeded anything heretofore attempted in any age or country.

The oldest ruins unearthed in any part of the world, show the same fundamental principles of brickwork as those in vogue today. This does not mean that the same methods of work prevailed in every country, for the art of today is nothing more than a combination of the best of all methods used.

Editors' Note—This is the first of a series of articles in which Mr. Gohn will give detailed instruction in bricklaying as an Industrial Art. Mr. Gohn is a graduate of the Williamson School of Trades and a journeyman bricklayer of experience.

Now that education is tending toward the Industrial, we should endeavor to install all the common industries in the curricula of the various schools thruout the country, allowing that such be used as are best suited to the environment of the locality to be considered.

Following the consideration of the environments of the locality in question are the economical aspects of the courses to be instituted. Heretofore, lumber has been the most abundant and cheapest staple material of construction; but its supply is gradually being exhausted. With the modern improvements of machinery and methods of manufacture, the cost of brick has been so reduced, and its production so increased, that the relative costs of construction between wood and brick have been made more nearly equal; the latter now only exceeding the former from three (3%) to eight (8%) per cent in the initial cost. These figures refer to permanent and actual construction, while in the school shop, the relative cost is still further reduced owing to the repeated uses to which the brick may be put. Of course, to make this possible, the teacher must be ever on the alert to see that the students do not wantonly break or destroy otherwise good material.

The introduction of bricklaying into the school curriculum not only provides a manual subject, but a mental one as well. This may be brought about by having the students give careful consideration to the aesthetic as well as the constructive features of the materials. In speaking of the aesthetic we may mention three ways in which this feature may be brought out, namely, Texture, Color and Design.

Texture is determined by the size of the brick, their color and finish, and the distance they are separated from each other by the mortar joints.

Color is obtained by the blending of the various shades of brick with a corresponding or contrasting colored mortar joint. When it is taken into consideration that the mortar joint constitutes from one-tenth (1/10) to one-fifth (1/5) of the finished wall, its influence on the color scheme may be readily understood.

Design is determined by the "bond," referring to the facial pattern worked in the wall, rather than to the method of tying or connecting the several tiers of brick together. However, the aesthetic is not the most essential quality in brickwork. More thought and care should be placed on the aim for safe construction, referring to the term "bond" in the sense of binding the several parts together. Therein lies the "art" of bricklaying.

As in all other modes of industry, so in bricklaying, there are certain definite and detailed rules or principles which must be followed, if we are to have success in the art. The following are a few of these principles stated in the form of axioms:

1. Wet all mortar-boards before placing mortar on them, in order to prevent the dry wood from absorbing the moisture from the mortar.

2. Keep mortar well tempered at all times, that is, of the proper consistency.

3. The shank and ferrule of the trowel should be kept free from mortar while working.

4. The brick should be laid level and true with the preceding work.

5. All corners should be built plumb, unless otherwise authorized.

6. In plumbing a corner or portion of brickwork, care should be taken not to strike the plumb-rule or level with the trowel or hammer.

7. All work, where possible, should be laid to a tight line, stretched between two plumb corners.

8. The line should be advanced only one course at a time.

9. The brick should not be laid "hard to" the line, that is against it, but should be one-sixteenth (1/16") of an inch back from it.

10. The brick should be kept clean in laying them.

11. The mortar joints should be of uniform thickness.

12. The various treatments should be applied to the joints while the mortar is yet green.

13. Spreading should always be done from left to right, providing the person is right-handed.

14. Make as long a spread as possible (preferably four (4) or five (5) brick lengths), with one trowel in order to economize on time.

15. Keep the person and place of work as neat and tidy as the work will permit.

Since brick are held together by the cohesion of the mortar, it follows that all of the surfaces thus joined should be entirely covered with the mortar. Nor is the covering of the surfaces all; the brick should be well rubbed down into the mortar when laid, so as to work the mortar into the pores of the brick, thus making a firmer bond.

In dry weather, brick should be wet before laying them. This is done for two reasons,—to remove the loose sand or dust, and to prevent the brick absorbing the moisture from the mortar, which otherwise would set or harden, and not produce the proper bond. In damp or humid weather, this wetting may be dispensed with. It should never be attempted in freezing weather because the water forms an icy film on the surface of the brick, thus closing the pores.

To prevent any injury to a wall from rain, snow or any other cause, during its course of construction, the top courses of all walls should be covered with boards or planks to preserve them over night. If for any reason work should discontinue, for any great length of time, as in very cold weather, the top courses should be carefully covered with tarpaulins, canvas or tar-paper and these weighted down with planks.

All brickwork affected by frost should be discontinued until such work has been torn down and rebuilt, as frozen walls are apt to slide or buckle.

Often shortly after walls have been completed, a white filmy substance will appear on the surface of the brick. This is known to the trade as "efflorescence," and is caused by one or more of the following reasons:

1. The water used in making the mortar absorbs the salts of potash or soda from the brick and when it evaporates, these salts are deposited on the surface of the wall.

2. The soda in the brick is drawn out by capillary attraction.

3. The clay in the brick contains iron pyrites or else is burned with sulphurous coal, thus forming sulphuric acid, which combines with the magnesia in the lime to form a white salt.

4. The clay of which the bricks are made sometimes contains soluble salts which are dissolved by rains and deposited on the surface of the wall.

The Sylvester wash has frequently been used as a preventive; and with fairly good results. The method of the wash follows:

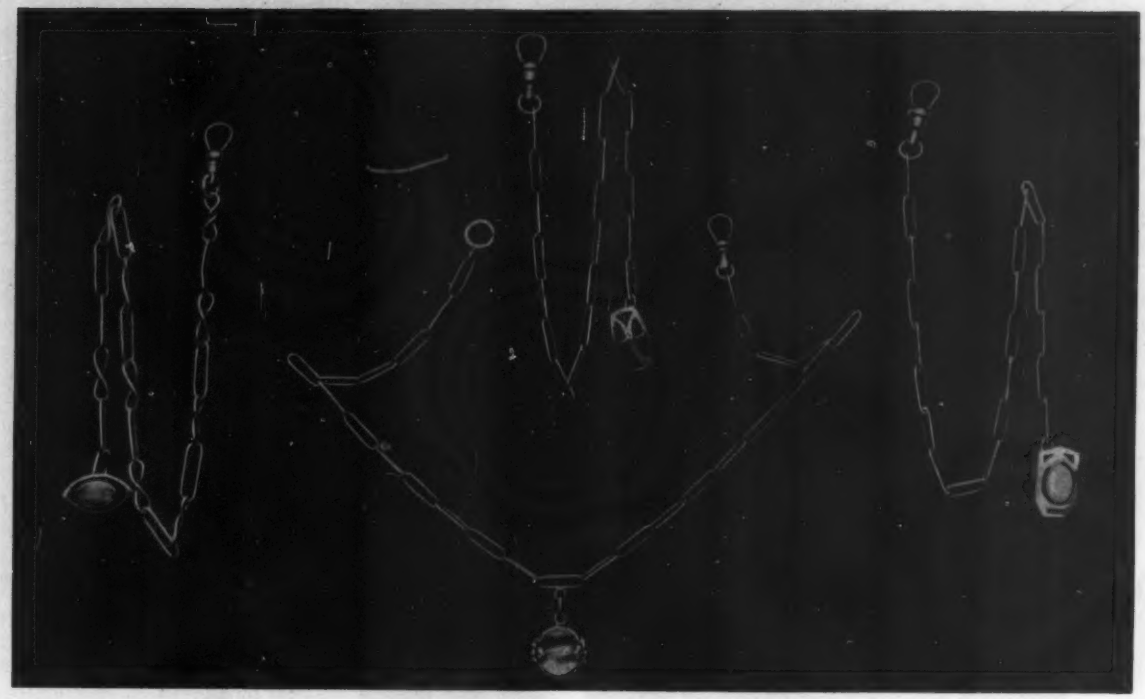
1. Clean surface of brickwork with a diluted solution of muriatic acid (1/12), applied with a stiff brush.

2. Twenty-four hours later, apply the "Castile soap wash," which is in the following proportions: Three-quarters (¾) of a pound of soap to each gallon of water. This should be applied boiling hot, with a soft wall brush, care being taken not to form a froth.

3. Twenty-four hours later apply the "Alum wash," consisting of one (1) pound of pure alum to eight (8) gallons of water. This may be applied with the same brush, but at a temperature of 60 degrees to 70 degrees Fahrenheit.

Alternate coats of soap and alum are applied every twenty-four hours. Usually four coats will make an impervious coating. The soap and alum combine and form an insoluble compound, filling the pores of the brick and preventing the seepage of water. The walls should be clean and dry, and the temperature of the air not lower than 50 degrees Fahrenheit, when the composition is applied.

(To be Continued.)



LAPEL CHAINS. DESIGNED AND MADE BY MR. SORENSEN. Photo: Elite Studio

HAND-WROUGHT JEWELRY

H. R. Sorensen, Proprietor of the Orno Shop, DeKalb, Ill.

(Third Article)

THE first step in the making of a piece of jewelry in which a stone is to be set is the selection of the stone. For the beginner's work, this includes not only the choice of color, shape, etc., but also the quality of hardness. This usual and desirable quality is not present in all gems. For instance, the Opal, Malachite, Azurite, and Coral are soft stones and are, therefore, not best to begin with. The hardness of stones is graded by an arbitrary scale of from 1 to 10. Talc is a type of the softest or 1, and the Diamond is the hardest or 10.

The gem used in the scarf-pin described in this article is an agate. This stone may be called a fairly

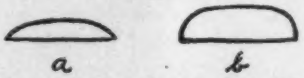


Fig. 7. a—Low Cabochon Cut. b—High Cabochon Cut.

hard stone ranking about 6½ in the scale. One may feel perfectly safe while working with a stone of this or greater hardness, as far as scratching is concerned, provided it has the cabochon cut. (See Fig. 7.) The Amethyst, Topaz, Sardonyx, Garnet, Jade, and Moonstone are all practical stones for a beginner, as the hardness of each is 6 or above.

After the stone has been selected, a suitable design must be worked out. The design to be used depends very largely upon the shape of the stone. The lines of the design should harmonize with the outline of the stone. Therefore, when starting a design, the outline of the stone should be traced upon the paper and a pleasing design created around it. It may be necessary to make several designs before a satisfactory one can be obtained. If the design is to be symmetrical, one-half can be drawn accurately and traced on tracing paper. By folding the tracing paper, the second half may be drawn to correspond to the first, as indicated in a previous article.

The number of designs one can make around a single shape is unlimited, as they may be varied and elaborated as shown in the sketches. (See Fig. 8.) This should always be kept in mind, that the stone is the center of interest, and that the design must enrich its beauty, not detract from it or overwhelm it.

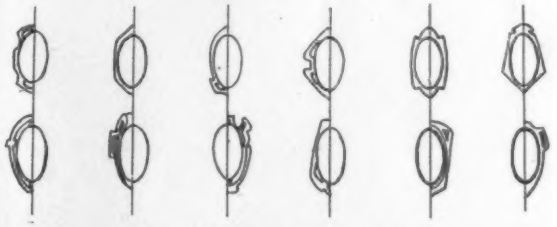


Fig. 8. Freehand Sketches Suggesting a Variety of Simple Scarf Pin Designs.

After the design has been completed, it is traced upon a piece of gauge 18 sterling silver and retraced with a sharp punch. Then the outside edge of the design

is sawed out and finished as explained in previous articles.

The bezel is an important factor in the setting of a stone. This is a metal band which holds the stone in place, and in this problem, it consists of a strip of silver, gauge 28. This strip is cut by use of shears for this particular stone, about ⅛ of an inch wide and three times the length of the stone. This is a good rule for most shapes. The silver should be annealed before cutting. Annealing is the process of heating and gradually cooling the silver for the purpose of softening it and rendering it less difficult to work.

By the use of the half-round pliers, the strip of silver is shaped as nearly like the outline of the stone as possible. The stone is then laid on a flat surface and the bezel placed around it. The silver will be seen to be longer than the distance around the stone, hence it must be cut off. It will be necessary to continue the shaping and fitting of the bezel until it fits snugly about the stone. The ends must be filed until they meet perfectly. The bezel must not be too large. If it should be a little too small, it can be easily stretched after it has been soldered.

By bending the silver back and forth, the end can be brought together to make a perfect joint. Sometimes a piece of fine iron wire is wrapped around the bezel and twisted at the ends with pliers, to hold the ends of the silver in perfect contact. This method is not advised in this case. The difficulty is that the ends either tend to lap or to stand apart. Unless the ends come in direct contact, the solder will flow on only one end of the silver.

The bezel is placed on the soldering block in the position it will have on the silver of the scarf-pin. Borax solution and a piece of solder are now placed exactly on the joint. The blowpipe is used and the soldering done exactly as described in the February issue. Since the silver is very thin, there is some danger of melting it, so care must be used not to get it too hot.

The soldered bezel should be cleansed with the sulphuric acid solution, and rinsed in water, being sure to remove the iron wire if it has been used. The superfluous solder is filed away, and the bezel tried on the stone. If it is too small, it may be stretched by placing a tool of the proper shape inside of the bezel and tapping the outside with a hammer. It is a common practice among jewelers to place the bezel over the handle of a pair of pliers and striking with the hammer. The bezel should be large enough for the stone to be placed into it and removed without difficulty. When it is finished, it should be gotten ready to solder to the silver which forms the base.

That part of the bezel which comes in contact with the base silver must be filed flat with a fine file. The outside of the bezel must be free from marks of file or hammer. The beginner should paint the joint with a mixture of Ochre and water to prevent it from unsoldering when the second soldering takes place.

The bezel is picked up with tweezers and the lower edge dipped into the borax solution and put in position on the silver, which has been previously scraped. After the borax has dried, there is not much danger of the bezel being moved out of place. Four or five small pieces of solder are placed on the inside of the bezel, touching both the bezel and the base silver. The work is then placed on a piece of charcoal or asbestos in such a position as to admit the flame under it. The heat is then applied as before.

The next step is to make and solder on the pin stem. Scarf pin stems can be made or purchased. The making is very simple. A piece of German silver wire gauge 18 and 2¾ inches long, is filed flat on one end and to a point at the other. A little ring of silver wire is made to fit the pin stem, Fig. 9. It is for the purpose of adding strength to the pin stem at the place of soldering. Altho this is the stronger and better way, and is used by experts, a great many people solder on the pin stem without this reinforcement.

The pin stem is soldered on the silver in an upright position. The reason is that the heat softens the pin

SCARF PINS. DESIGNED AND MADE BY MR. SORENSEN.

SCARF PINS. DESIGNED AND MADE BY MR. SORENSEN.

stem which must be hardened after the soldering is completed. In order to solder it in an upright position, a device (See Fig. 9) is made of gauge 20 iron or German silver wire and stuck into the charcoal block. It is a great convenience.

After the pin stem has been soldered on, it is placed on a smooth iron surface and tapped lightly with a flat faced hammer until it becomes hard. The hardening can also be done by placing the pin in the parallel pliers and twisting. When a satisfactory hardness has been obtained, the pin stem is bent to proper shape by holding the pin with pointed nose pliers and bending it into position with the fingers. The scarf pin is then cleansed thoroly with pickle.

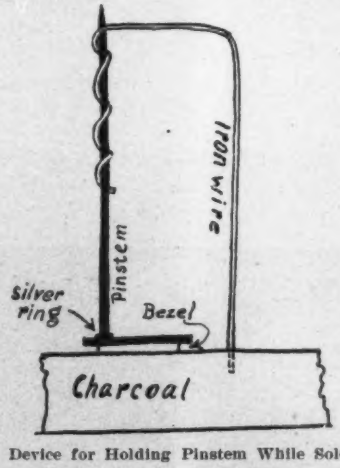


Fig. 9. Device for Holding Pinstem While Soldering.

It will now be necessary to reduce the height of the bezel before setting the stone. It is always advisable to make the bezel quite high to start with, as the surplus can be filed off, but it is impossible to add anything. The height of the bezel is decided by examining the cut of the stone. This stone having a low cabochon cut (See A, Fig. 7), a low bezel may be used, as the curve of the stone forms a small angle with its base. In the high cabochon cut, a higher bezel is required, since often the sides of the stone stand almost at right angles to its base.

One-sixteenth of an inch is enough for the bezel in this problem. It is always the aim of the craftsman to have as little of the bezel showing as possible, in order to show as much of the stone as possible and to lend its proper element to the design. Care must be taken, of course, not to get the bezel so low that it will not hold the stone; the constructive necessity always comes first.

When the filing has been finished, there will be a burr on the outside and on the inside of the bezel. The inside burr can be removed by the use of the scraper and the outside one by the use of the file.

In order to hold the scarf-pin firmly while setting the stone, one should have a block of hardwood with a ¼" deep saw cut in it. (See Fig. 10.) The pin stem fits into the saw cut.

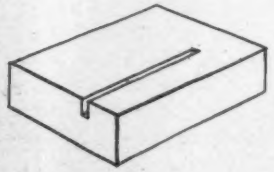


Fig. 10.

Fig. 11. a—Pushing Tool. b—Burnisher.

The tools used in setting are very simple and are easily made. One is a pusher and the other is a burnisher. (See Fig. 11.) Place the stone into the bezel and put the pin stem into the saw cut in the wooden block. One hand holds the stone in the bezel while the other hand pushes over the edge of the bezel against the

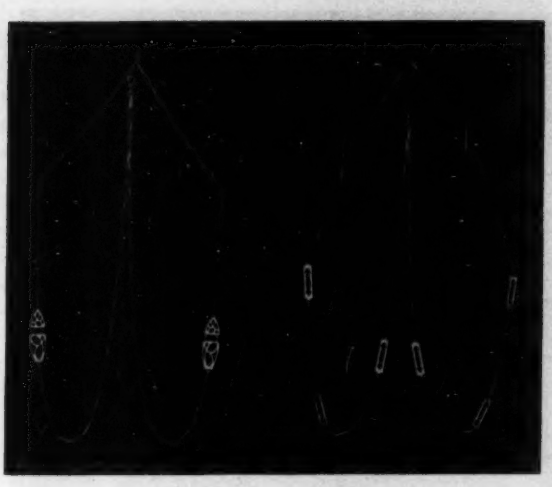


Fig. 12. Ladies' Coat Chains.

stone with the pushing tool. The pushing should be started at a certain point and continued around the stone. This process leaves the edge of the bezel rather rough. This is removed by forcing the burnisher along the side of the bezel. The very edge of the bezel is finished by running the burnisher along the top of the bezel against the stone.

The scarf-pin is now ready for oxidizing as described in the January issue.

A Lady's Coat Chain.

The only new work to be described in this problem is the making of the links and the rings which are to be soldered onto the motifs. The process of making the motifs (See Fig. 12), needs no further explanation, since all the work necessary has been described in previous problems.

The motifs can be varied to a great extent both in design and in number. Some coat chains are made with six motifs, some with four, and some with only two. Simple designs are desirable for the first.

The small round rings which are soldered to the motifs are made by winding wire around a mandril. This mandril is a round piece of metal, anything one happens to have at hand. It should be the size desired for the inside of the rings. When enough wire has been wound on the mandril, the spiral of wire should be removed and cut thru the center with a fine saw. A number of small, separate rings will be the result. It is necessary to make the two ends of the wire of each ring join perfectly. This can be done by bending back and forth with pliers until they meet. Each ring is then filed at the point where the ends join, in order to make it fit the place where it is to be soldered onto the motif.

The making of the long oval links for the chain is a little more complicated. The thickness of the wire from which the chain is to be made, depends upon the size of the link wanted. For the coat chain, gauge 18 or 16 may be used. The mandril used for these links can be made of brass, copper, or iron. The best size for the mandril is about one-sixteenth of an inch thick, seven-sixteenths of an inch wide, and four or more inches long. It must be accurate in measurements or there will be difficulty in removing links.

First of all, two strips of tough paper, ¼" wide, should be wound onto the mandril as shown (See Fig. 13A). One strip is wound one way with the edges of the paper meeting, and the other strip is wound the other way. A piece of binding wire (iron wire) is wrapped around the end to keep the paper in place.

Designs for Motifs.

The silver wire should be annealed before winding it onto the mandril. The wire is then fastened in the vise (See Fig. 13b). The end of the wire is held with the pliers tightly on one end of the mandril. The mandril is then turned over and over by means of the pliers, thus wrapping the wire round and round the mandril. The wire should be kept very tight all the time. The links should be wound as close to each other as possible. After the mandril has been filled with the links, the wire is cut off.

Before trying to remove the coil from the mandril, it is thoroly annealed again. This not only makes the wire soft so that it will keep its proper shape, but it also burns off the paper beneath the wire. This permits the coil to slip off easily.

When the coil has been removed from the mandril, the links must be cut with a fine saw, as were the round ones. Great care must be used to see that the joint comes in the end of each link. It is also necessary to bend the ends with the pliers to make them form a perfect joint. Sometimes the links are cut with shears. Great care must be used to see that the shears have the proper shape of blade, and that the cutting is so done as to leave the ends of the wire in such a condition as not to interfere with the making of a perfect joint.

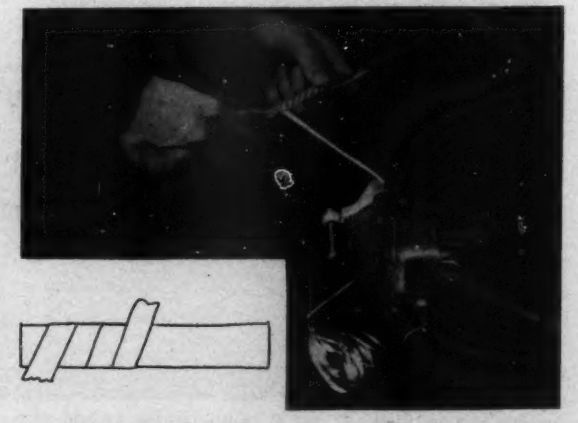


Fig. 13a (outline). Wrapping paper around Mandril. 13b (photograph). Wrapping Wire on the Mandril.

When the links are ready, several of them are laid on the charcoal block and a drop of borax solution is applied with a small brush to each joint. A small piece of solder is placed on the joint so that it connects the two ends of the wire. By use of the blowpipe, the flame is applied to the end of each link until it is joined. If too large a piece of solder has been used a little lump will be left at the joint. This must be filed off.

After a number of links have been soldered as described, two soldered links are connected with an unsoldered one. Several such groups of three are placed on the block and the unsoldered links soldered as those before. Then two of the three-link groups are connected with an unsoldered link, and so on until the chain has reached the proper length.

After the chain has been cleansed with the acid solution, it is tested as to strength by pulling with the hands. It is then drawn thru a draw-plate, in order to make the links all the same size. The draw-plate is of hardened steel and has graduated holes in it. As a substitute for the draw-plate, a hole a little smaller than the width of the links may be bored in a piece of hardwood and the chain drawn thru it.

When the links have been thus straightened, the chain is cut at the places where the motifs are to come. Of course, the motifs may be placed anywhere in the chain, but as a rule, the following measurements are good: First connect two motifs with 16 inches of chain, then put the other motifs about three inches apart, putting the same number on the two sides of the chain. The whole chain, when completed, measures from 50 to 54 inches.

The chain is connected with a swivel for the attachment of a watch, purse, or vanity bag. When it is completed, it is oxidized as previously described.

Lapel Chains.

The gentlemen's Lapel Chains shown in the picture at the head of this article, are made in the same manner as the Coat Chain. The links may be made of the same size and the same gauge of wire. When completed, the chain is nine inches long. In order to connect the chain with the lapel button, a small round link is soldered underneath in the center of the button. The Lapel Chains are worn a great deal and make a most acceptable and practical gift.

THE LATE CALVIN M. WOODWARD,
St. Louis, Mo.

Calvin M. Woodward, founder and director of the St. Louis Manual Training School, and for many years a leading spirit in the movement for manual training in the United States, died January 12th at his home. Dr. Woodward was 77 years old.

Calvin M. Woodward was born in Massachusetts and graduated from Harvard University in the early sixties. From Massachusetts he migrated to the west, locating at the Smith Academy in St. Louis. In 1879 he formed the first manual training school in St. Louis. He served, also, as a member of the board of education and twice as president of that body.

Dr. Woodward was author of several publications among them "The Manual Training School," "Manual Training in Education" and "Applied Mechanics for Engineering and Architectural Students."

Suggestions for Architectural Drawing in High Schools

E. J. Lake, Art Department, University of Illinois
(Second Article)

FOLLOWING the drawing of the first-floor plan at approximate scale on cross-section paper, the second-floor plan is drawn by tracing from the plan of the first floor. Translucent tracing paper that is rough enough for pencil and transparent enough to see the lines of the plan below is best for this purpose. Such paper is sold by dealers and is used generally by architects in the way described.

All walls that continue up thru the second floor can be traced from the first floor. Stairways can be traced from the first floor as they extend to the second floor and a broken line drawn across the flight as they extend beyond the limits shown in the second-floor plan.

The position of windows on the first floor can be noted and those of the second floor can be placed with reference to them to the best advantage of the room and the exterior appearance.

Chimneys and Flues.

Chimneys must, of course, be carried up thru the second floor and attic to the roof at the same size and in the same position as on the first floor. It is never advisable to reduce smoke flues in size. Their size is represented in the size of the brick used and not of a size that requires cutting the brick. A flue, one brick square, in plan is good for the range flue and for small fireplaces.

A furnace flue may well be 1½ brick by one brick in size. With a kitchen range, a small fireplace and a furnace or other heating plant to account for a flue plan as shown in Fig. 7 is adequate. All brick construction should be planned with thought of brick sizes without needless cutting of the stock brick.

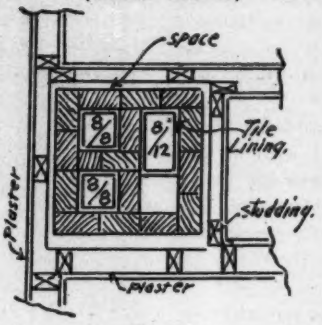


Fig. 7.

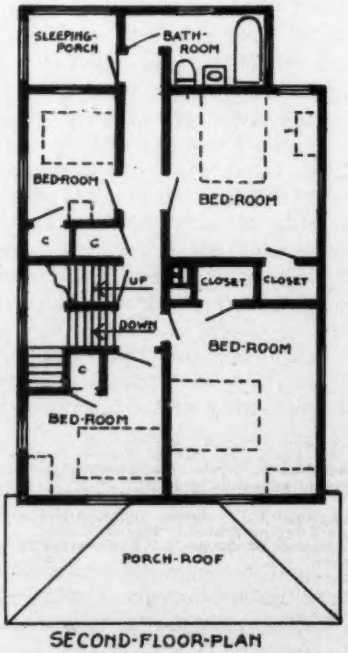
All brick flues should also be furred with two-inch studding and a space of one inch between the outside of the brick and the wood. It is never advisable to plaster directly on brick without a space in the wall to stop moisture or to extend a wooden or lathed partition with brick. A seam or crack will result where the division between the lath and the brick is made. All flues should be lined with tile sections made to fit inside each flue and built in as the flue is built. Fig. 7 shows a plan of the flue for the conditions of the house shown in the drawings of this article.

The course of a chimney may be changed by a slant of six inches in ten feet in the attic of a house without damage if well built but such a change of position in a flue is not often necessary. Chimneys should not be planned to come thru a roof in a valley of the roof. Where this is unavoidable, a saddle or little roof should be built in the valley to fill the pocket behind the chimney and prevent leaks.

Necessary Details.

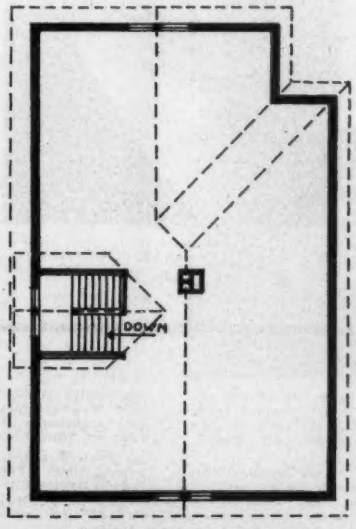
The roofs of porches that do not go above the first floor are shown on the second floor plan.

In frame buildings, partitions of the second floor need not come over those of the first floor but partitions



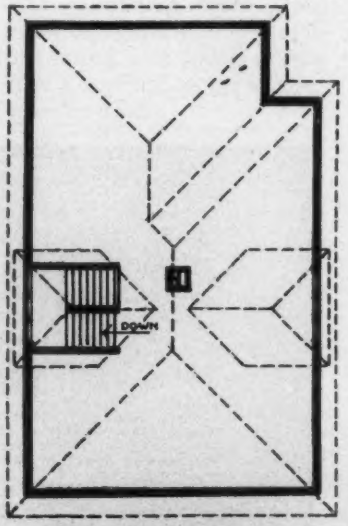
SECOND-FLOOR-PLAN

Fig. 8.



ATTIC AND ROOF PLANS WITH GABLES.

Fig. 10.



ATTIC AND ROOF PLANS WITH HIP ROOF AND DORMERS

Fig. 9.

Figure 11.

that bear the weight of the roof should come over those of the first floor or be strengthened by special construction.

The stairs leading from the first floor to the second should run from the outside of the house toward the center. This reduces the hall space on the second floor by bringing the stair landing near to the rooms of the second floor.

The hall or passage of the second floor should never be less than three feet in width.

A plan is a horizontal section thru the house above the sills of windows. When windows are placed exceptionally high as is often the case in bathrooms, they are drawn as other windows on the floor as noted on the plan.

Stairs and Stair Details.

Stairs are represented in plans by lines representing the risers and are broken off by irregular lines across the plan to show other steps or closets above or below. In many plans, as in the one shown in Fig. 2, the stairs occupy space that reduces the rooms on the side of the house on which they are placed. The rear room on this side of the house results in a minor bedroom. The front room can be used for a sewing room, den or small bedroom off the hall or it may be connected with the larger front room forming a suite.

There is, of course, great temptation to economize space by putting closets over stair flights. This temptation often causes scant head room on the stairs. Head room should not be less than seven feet and a little more is better where tall people live.

It may be noted that the attic stair of the plan shown in Fig. 8 runs up from the second floor, over the kitchen stair below. The stairs of this design are most economically arranged from cellar to attic.

In the plan of the first floor, shown in the first article, a combination stair was used with one flight serving for the upper part of the stairs from both the front hall and the kitchen. The cellar stairs run down under this flight to the second floor.

On the second-floor plan it will be noted that the flight to the attic runs up over the kitchen stair. This method of running flight over flight and the use of a combination stair between the first and second floor is the extreme of economy of the space which must be used for stairs in a two-story house with attic. Combination stairs are not desired by all housekeepers, however, and such a plan may be the extreme of economy which fails to please. Greater variety and ease may be given a plan that does not follow such strict economy of space.

It will be noted that in the plan shown, every bedroom has a generous closet and that one is placed off the hall. The sleeping porch is accessible from the hall. The bathroom is similarly accessible from the hall. Each of the bedrooms has windows on two sides. There is space for a bed on the inside wall of each bedroom and a space for a dresser between windows in all but one. These are all points of general choice tho no plan can serve all conditions favorably. Tastes and conditions differ and a study of planning under various accepted conditions is most desirable in the study of architectural design.

Attic and Roof.

The attic and roof plan are next to be considered. They may be shown in one drawing for a small house by representing the attic plan in solid lines and the roof plan in broken lines as in Fig. 9.

Two points are important with regard to the attic plan. First: the attic should be lighted and ventilated by windows on opposite sides. Secondly: the attic stairs must be given head room under the roof. When attic stairs land toward the center of the attic, there is no difficulty with head room. When they run as in the plan shown, a dormer or gable must be put over them to give head room. In the plan shown, a hip dormer is used, and a similar one is placed on the opposite side to give light and ventilation to the attic. These symmetrical dormers also relieve the roof and add to the exterior effect. Fig 10 shows a gabled roof for the same plan. Any roof plan should be simple and avoid pockets, decks or flat roofs that are liable to leak. Many interesting effects in roofs as they are represented in pretty bungalow pictures are not practical when constructed. The roof of a design should be candidly a shelter for the house and the desired effect depends on the simple expression of purpose with good proportion.

No definite projection of the roof over the walls can apply to all cases.

The lines of the roof plan as shown, represent ridges, valleys, hips and outside limits of the roof. When pupils are unable to conceive the form of a house and are unable to draw in perspective to gain that conception, it is well to have them make paper models of their house at small scale as suggested in Fig. 11. These sketches represent the exterior appearance of the house represented by the drawings of this article with the two kinds of roofs shown in Fig. 9 and Fig. 10.

The Value of Home Economics in Our Schools

Grace Viall Gray

THE study of Home Economics is not merely the study of cooking and serving as so many believe. The famous scientific homemaker, Mrs. Ellen Richards, said: "Domestic science is the 'keystone' in the arch of all the sciences." There is no other line of training that affords such an opportunity for a wider range of knowledge and correct information as does Home Economics. Useful facts and knowledge in every field may be drawn upon in studying and teaching Home Economics. Every domestic science teacher will find that she will call upon all her funds of information in teaching this study.

Home Economics has great value because it is not only a practical and useful science, which fact alone recommends it highly, but it has also great educational, cultural, social and vocational values.

The very fact that it is informational puts it in the educational class for education means information. Anything that makes for refinement and gives an individual self-reliance, initiative, truth and sympathy for others is cultural.

A study or work that brings pupils into friendly, unselfish contact with one another has great social value. A study that prepares one to do some one thing well; that equips girls to earn a living in a happy, natural way has vocational value.

Home Economics does all of these things;—it informs; it educates; it refines; it creates sociability and equips for life work.

In the grade schools, where Home Economics is taught, these results have always been noticed:

(1) Control is gained over the body. Domestic Science and Domestic Art furnish an admirable way of gaining manual dexterity. Children soon learn to coordinate the brain and the hands. For children who have trouble in controlling the body by the mind, this study is most valuable. Muscle control is a very valuable acquisition for whatever life a child may live; there is, and always will be, a need of control over the body. Personal efficiency is developed by teaching hand and brain to work in perfect harmony.

(2) Domestic Science and Domestic Art furnish excellent means of gaining finger manipulation besides manual dexterity. An eighth-grade boy once told me that he had better control of his fingers in his manual training work as a result of his earlier domestic science lessons. The careful, accurate measurements which must be made in both cooking and sewing to obtain satisfactory results train the fingers.

(3) Home Economics teaches accuracy. When a girl is drafting patterns or cutting out a garment she must be accurate, else the result will be wrong. If she is measuring a fourth or a half-teaspoon of salt or sugar she must be accurate or the finished product will testify to inaccuracy.

(4) Home Economics is the best subject yet found to teach the power over things. It is humiliating to be conquered by things. If overcome by some person, we excuse this on the grounds that he is stronger than we, but to be overcome by things is a sign of weakness. Every girl gains great satisfaction in conquering yeast, baking powder, soda and flour. Personal responsibility is developed in the control of materials and natural forces, and the student soon discovers that her mind and muscles are all powerful and are the responsible factors in obtaining a desired result. She learns that luck is but a myth. If a girl pours boiling water on yeast, forgets salt, and sugar, is lazy in making her muscles work effectively, lets the dough stand a length of time convenient to herself, and fails to manage the temperature of the oven, she gets her just dues and gets in return a dark, sour, soggy, ill-shaped loaf of bread. Any girl worth while is put on her mettle by such an experience. On the other hand, if she obeys the laws of nature and follows out all the rules and regulations of her yeast mixtures, she will produce a sweet, creamy, delicious loaf of bread,—the staff of life.

Do I hear you saying "All very well, but let the girl make bread at home?" I reply, the girls will not make bread at home. There is a spice about doing things in a cooking room which is lacking in Mother's kitchen. Mothers often object to having their daughters do the kitchen work because of the inefficiency of the girls; or perhaps the maid in the kitchen objects to having things put out of place by the unskillful worker.

Child Acquires Habits of Neatness.

(5) Home Economics trains children in habits of order and system. Every teacher of this study demands that each child leave her desk in perfect order. Every saucepan, every spoon, every plate and knife must be left in the same place every time. A child unconsciously learns to put things back where he found them and to leave things in as good condition or better than he found them. Needles, thimbles and tape-measurers must all be put neatly away until used next time. Mothers all notice a decided change for the better in children's manners as regards order and system after taking two or three months' work in cooking and sewing.

(6) Neatness and cleanliness develop in the child. Neat caps for the girls to keep back the straying locks in cooking; a clean white apron every lesson for everyone; little immaculate butcher aprons for the boys all have an effect upon the children. Clean hands only can touch food materials and new fabrics, and consequently clean hands and clean clothes are a desired goal. The immaculate habits of neatness and cleanliness, which are demanded in the cooking and sewing rooms, as nowhere else, soon become little fixed habits that will follow the children from the grade school thru life.

Correlation With Arithmetic.

(7) Other grade subjects are closely related to Home Economics. Cooking and arithmetic can be so closely connected that the child will delight in working out fractions by using recipes. Cooking is a decided aid

in teaching arithmetic, as it demands constant use of fractions, numbers, dollars, cents, pounds, ounces, quarts and pints. A child quickly sees a need of mathematics in his cooking and the teacher profits by this need. She will bring her classes thru the complexities of arithmetic very easily in the cooking lessons. The special Domestice Science teacher, can co-operate with the grade teacher to their mutual benefit. In the smaller and rural schools, where one teacher teaches everything, she can erase from her chart the period usually devoted to mathematics and add it to the cooking period to the profit and satisfaction of both pupils and herself. The scales; the dividing and multiplying of recipes; the cost of food before and after cooking; the number of people served at a meal; the costs of meals, etc., are all problems in arithmetic. Any child would rather work out a problem dealing with the amount of food eaten in his family than the horribly stupid problems about how long it would take a train to reach such a point going at such and such speed.

Mathematics can play a large part in jelly making—the cost of the fruit used, the amount of sugar needed, the cost of one individual glass of jelly, the cost of two dozen glasses, etc.

The therometer offers good suggestions for mathematical problems. The difference between Centigrade and Fahrenheit becomes a reality in the cooking room while it remains a vague theory looking at arithmetic books. Children who have Home Economics will reach the eighth grade much better mathematically equipped than the children who have been taught merely from books.

Correlation With Other Subjects.

Cooking makes geography more interesting. To learn where the various articles of food used in cooking come from is more interesting than to read a day's lesson from the geography. States and countries become real when it is known that the commodities used in that morning's lesson were grown there.

Cooking and composition are related. The correct wording of recipes and methods of cooking is a most excellent form of composition. A short paragraph on the source of some herb or spice would answer the same purpose.

Cooking and written work need not be separated. Copying of recipes can be the written work.

New words in spelling can be taken from the cooking lesson.

A cover for the recipe book can be made a part of the occupation work in designing.

(8) Home Economics develops the power of observation. After studying it a child will notice things in the home; in the preparation and serving of meals; in the picture on the wall—things to which he had been so accustomed he had hitherto failed to notice until they were talked about in school. He notices how many dishes there are to be washed and possibly he offers to help. He notices that the cake is especially good and speaks about it to his pleased mother.

He notices the dirt he tracks in and remembering some of his "Dust" lessons is perhaps more careful than he would otherwise be.

Home Economics deals so emphatically with the problems relating to home and home life that it cannot help but open the eyes and make the child not only more observant but also more appreciative of the daily work done in his home for the comfort of himself and other members of the family.

(9) It gives the child of a practical turn of mind, who has skillful fingers, a chance to show what he can do. He may average low in history and geography, but when it comes to co-operate brain and hands, he may be a "shining light."

Often a pupil who is lowest in the purely memorizing studies will be excellent in finger work. Every child is not the same and the practical child needs the Home Economics as a means of expression and development.

Social Value.

(10) The tenth, and possibly the greatest value of Home Economics in the Grades, is the social value. The Domestic Science department of a school is the logical social center and furnishes the means for carrying out social activities.

Pupils should receive training in social life during school hours. School life is not only a preparation for life, but it is a life itself. The pretty luncheons planned, cooked and served by the children at Thanksgiving and Christmas time to parents, bring the children in close comradeship with each other and their parents as no amount of class work can do. The exhibits of their sewing and designing have the same effect. Little traits of greediness, selfishness and unselfishness crop out and the wise teacher is at hand to crush the undesirable acts and encourage the desirable.

A Domestic Science teacher once said "Little individual tendencies appear at our own little luncheons served once a month that I never suspected existed before. It affords me splendid opportunities to correct bad manners, little breaches of etiquette and to cultivate an attitude of respect towards one another. Mothers come and tell me how pleased they are in Johnnie's and Mary's improved table manners."

It is true that often a few words from "The Teacher" will do a world of good and accomplish the desired end, whereas mother could talk for many moons about the same subject.

Where there are many children there is always a rivalry to excel whereas at home this is lacking.

Good table manners, formed at this period in the child's life, will follow him thru college and thru life, and small as they may seem, they often play a large part in the child's future career winning him success or failure.

A college president never employs a Domestic Science teacher who is not able to handle her knife and fork skillfully. This viewpoint may seem "far-fetched" to some but it's a correct one; for if a teacher is to be entrusted to teach table etiquette she should know the right way herself.

The learning of gracious manners, the close comradeship of children in the cooking and sewing rooms, the interest bond between parents and children certainly justify the claim of social value of Home Economics.

Correlation of Home Economics With High-School Subjects.

The close relation of this useful art to all the other subjects taught in the high school justifies and commends its existence. For instance, in the study of physiology the girl learns about the digestive tract. In domestic science she learns what foods are suited to the various needs of the body and which of the foods give the most nourishment. Fudge, dill pickles and olives soon lose their vital interest as the noon-lunch when a girl studies food values.

A girl sees absolutely no reason why she should be compelled to study physics as that is "a boy's study" until suddenly she discovers that she can apply the laws of physics in Home Economics. In physics the principles of solution are taught and the girl sees immediate application in the use of gasoline, benzine, etc., for cleaning of clothing and kerosene for cleaning the bearings of her sewing machine. In physics the diffusion and evaporation of gases are taught and the girl understands then why gasoline is more dangerous than kerosene at an ordinary temperature and why a full kerosene lamp will not explode while one only partly filled might do so if standing near a hot stove.

After studying air and heat currents she knows how to regulate furnace and hot-water systems and she knows why her stove smokes on some days and not on others.

After studying density she can apply it to her cooking lessons, adding salt and sugar to increase the density, or adding salt to the water in the outside dish of the double boiler thus increasing the temperature of the water.

If a girl's course in chemistry can be made to apply to the coloring, laundering, and dyeing of clothes, chemistry becomes of concrete applicable value to her. Chemistry is doubly interesting when it is applied to the food she eats and prepares.

Botany and Zoology may likewise be applied to the study of plants and animals that furnish materials for the food she eats and the clothing she wears.

The threads of connection between physiology, physics, chemistry and biology and Home Economics are so woven together that they are really one concrete body of interesting and related facts.

It can be readily seen that the required subjects of the high-school curriculum can be correlated to the practical everyday life of the girl. When this is done the girl is immediately interested.

In addition to developing a girl's relating powers, Home Economics offers other advantages to a girl of high-school age.

It develops the sense of beauty and fitness. A high-school girl needs this. She is ready now to understand that elaborate, ornate household furnishings, extreme fashions of dress and display of food at meal-time are very poor taste. She will soon be converted to a wholesome standard of living that will have its influence upon the home in which she lives.

Hygiene is so necessary! The girl can be taught the principles of hygiene and sanitation. She should understand ventilation, plumbing, heating and lighting in their relation to health and efficiency.

The study of accounts is a vital matter. Most women have so little idea of business methods! A course in household accounts, trains a girl in the significance of expending money. She learns the just proportions between expenditure and income, and how to buy material and food to the greatest advantage both to herself and the pocket-book. A most valuable and much needed education is this—a sane notion of money values. A course in this is invaluable and priceless.

A girl gains mechanical ingenuity in this useful study. The average girl before entering Home Economics cannot put together or take apart a food chopper, an ice-cream freezer, or take out the refrigerator pipe to clean it or oil a sewing machine but after completing the year's work, she is not only adept in all these things but can do many other necessary household duties that she had thought impossible before.

As in the grade school, Home Economics has great social value in the High School.

A girl who learns how to order and pay for food for a special luncheon, dinner or party; who issues pretty artistic hand made invitations, who appears and dresses graciously, who assists in carrying on the function, who has decorated the rooms and the tables, and who puts things in order after it is done is learning something of value for a life-time. It is of value because it is in line with her present and future life.

A girl is trained in responsibility by all this. A girl trained in these things at the high-school age hasn't as much thought for the boys and constant "good times" as the girl who hasn't anything substantial to take their places. But a practical knowledge of the everyday problems and duties of life; the knowledge of things worth while and the people worth while will occupy her mind because their applicability is everywhere manifest.

I SAY again, as I have often said, that if the world cannot hope to be happy in its work, it must relinquish the hope of happiness altogether.

William Morris

Old Fort Vincennes. Constructed by Third Grade Pupils, Danville, Ill.

GUIDING PRINCIPLES FOR A COURSE IN INDUSTRIAL ART FOR THE ELEMENTARY SCHOOLS

With Suggestions for the First Three Grades.

Mary E. Williams, Supervisor of Drawing and Industrial Arts, Danville, Ill.

THERE should be close contact with life and the activities which sustain it, in order that the child may realize the great forces which are moving our society.—*Selected.*

The subject matter in this course in Industrial Arts includes the story of the growth of the race in the use of the raw materials about him, from primitive to industrial methods, of transforming these raw materials into finished products to meet man's needs for food, shelter, clothing, tools, utensils and records. The subject-matter of the course also includes the simpler principles involved in tool processes and in graphic representation, and the influence of these industries and arts on the life of the people, with constant connection with related history, geography, arithmetic, literature, nature study, domestic art, agriculture and music.

If the school program is properly adjusted such a course will greatly vitalize the other subjects of the curriculum. The course is cultural in value and vital to the appreciation of one's environment. It has an intimate relation with the life experiences of the race as is shown in its art expression in pottery, textiles, basketry, metal and woodwork, and as reflected in its painting, sculpture and music.

The aim of this course in Industrial Arts is the development of social intelligence and appreciation thru understanding the things of the environment, which have resulted from man's transformation of the raw materials about him into finished products, to meet the needs for food, clothing, shelter, records, tools and utensils, and to satisfy man's innate desire to beautify his work.

The topics around which the course is organized are: how the race puts itself on record; how the race clothes itself; how the race feeds itself; how the race provides tools and utensils for itself; and how it expresses itself artistically.

The materials of the course are paper, textiles, wood, clay, metals, leather, foods, charcoal, colors, etc. The handwork in the course is for illustrative purposes, giving insight thru participation and sympathy by actually doing the things the race has done and is doing.

While the primary object of the course is the development of social intelligence and not the cultivation of technical skill, some degree of efficiency will result from proper gradation of the work, and from proper teaching of the processes. The child is taught to work correctly in all the grades, while in the advanced grades a higher degree of skill is required. We aim to discover and systematize the young child's interests that they may be utilized as subject matter for classroom work. Starting with a child's experience, we follow an evolutionary growth in thought and habit formation. Each year's work should make use of the experience and knowledge acquired in grades below it.

The character of the community makes its impression on the child, and the teacher of Industrial Arts must make use of the common knowledge, ideas and skill already existing in the community. The child must then be given a knowledge of many industries, and a degree of skill in some of them.

When a child first enters the school his experience and knowledge are bounded by the home and family in which he lives. The social experiences are here expressed by right relationship and social helpfulness. Some work should be given in which all the children can assist, as in planting the school garden and in constructing simple sand-table projects. While the home may be made the center of interests during the first years of

school life, the child is taken on excursions thru "Wonderland." He visits the homes of animals, insects, birds and plants. He lives with primitive people and he sees their customs and means of providing food, clothing, shelter and the other necessities of life. The child will then return to his own home life with a richer appreciation of its complex processes.

The first year of school, the child visits the people in Mother Goose stories, lives with Hiawatha and the animals, insects, plants, and the birds which Hiawatha calls his chickens. Later, he visits Docas the Indian boy, sees his brush house, sees him string his beads and decorate himself, sees him build the fire and cook his acorn mush and grass-seed bread, sees him go fishing and sees him learn his lessons from the birds, fishes, squirrels and other animals.

The children construct simple stick houses and tools of various kinds. The plants and the animals are drawn. Wigwams, canoes, animals, fruits, vegetables and so forth are cut, torn, and drawn. Illustrations are made by means of drawings, cuttings and combinations of cuttings and drawings. Booklets are made, decorated and illustrated. The Indian Camp is constructed on a sand-table. Clay animals are made and toys are drawn and constructed.

The first and second-grade children build the doll's house of cardboard and furnish it. The furniture made by the first-grade children is folded on the basis of the square, while the children of the second grade combine the square, the diagonal and the circle. Some pieces of furniture are made by measurements. Here children learn the use of the rule and to follow directions. The rugs are woven by the children, the wall paper decorated, the curtains hemmed and the pottery modeled by them.

In the accompanying photograph of the Doll's House, the house was made by grammar-grade children, under the supervision of the manual training instructor. The kitchen and dining room were furnished by first-grade children, the library and bedroom by the second-grade children, while the third grade contributed some of the furniture for the living room and the attic.

During the second school year, the children visit the tent of Joseph and live the pastoral life for a time. Here we see the sons tending their flocks and taking them from place to place to find water. Here we learn something of sheep raising, and cattle products. We lead the children to think of a time when people had no clothing except the skins of wild animals. Later we see them weave their simple cloth. We get the child in touch with pastoral life, and sheep raising, and he learns some of the processes of preparing wool for cloth. We lead the children to see how the sun and rain affect the soil, how the soil produces grass which furnishes food for the sheep, and they in turn supply the weaver with wool and food. We follow Joseph into Egypt and get a glimpse of higher forms of civilized life.

We study primitive man as exemplified in the growth and advance of the Aryan Nation, by visiting Kablu the Aryan boy. We lead the children to think of a time when the people had no shelter except the trees and caves, no food except roots, fruits, nuts, seeds, etc., and no fire. We notice simple methods of making fire and its value to man. We notice Kablu's simple home, see him worshiping the sun, see their simple meal. We see them plowing the fields for grain with their clumsy wooden plow. We watch them as they prepare the soil for the seeds, and we discuss early methods of farming, and compare them with methods the children know now. We encourage them to visit farms. We visit Kablu's clay beds and watch him in his efforts at making pottery and we make simple pottery.

We construct articles of furniture for the Doll's House as shown in the photograph. We draw plants and animals, toys, vehicles, etc. We illustrate by means of drawing, cutting, and construction, not only the life of Joseph, and of Kablu, but many other people with whom we come in contact in language, history, etc. The photograph showing the Japanese Garden, illustrates work done by second-grade children. A Japanese story was told to the pupils by the teacher. The teacher drew sketches, then cut and constructed the objects shown in the picture. The teacher drew the mountains on the blackboard back of the sand-table.

During the third year, the child reviews the story

Constructed by Third Grade Pupils of Danville, Ill.

Doll's House made by Primary Grade, Danville, Ill.

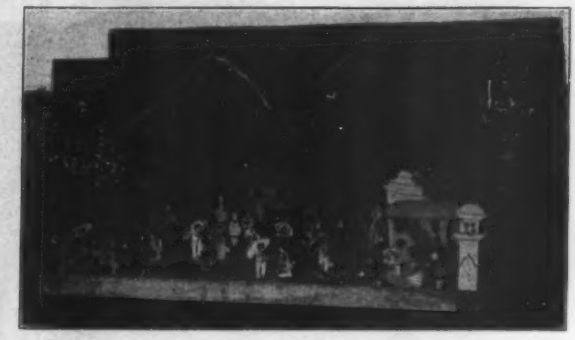
of Kablu. He follows the advance of the Aryan Nation, and sees the beginning of the history of Greece and Rome. He visits Cleon, the Greek boy, and Gilbert, the Roman boy. Villages are built representing the life of these people. The advance of the age of chivalry is very interesting to the pupils, and they are delighted to build a turreted castle with its moat and drawbridge, and its chalets, and to cut or model the brave knights.

The story of colonial days is studied, and the homes of many of our American heroes visited. We make a Pilgrim booklet in which we illustrate the Pilgrims' landing, the Mayflower, the Colonists' first hard experiences and their later success and Thanksgiving.

We discuss Nature's preparation for winter: how the leaves, the trees, the plants, the insects, the animals and the birds prepare for winter. We notice the construction of the seed, its life element, its methods of distribution, etc. We see the Colonists' preparation for winter, their storehouses, warm clothing, etc. This brings in drawing from nature, construction, paper cutting and various forms of illustrations.

We compare the furnishings of the Colonial homes with the homes of today. We construct the interior of the early colonists' home with the wide, low fire-place, over which hang the sword and the musket with its powder horn. We draw some of the old-fashioned furniture, the spinning wheel, the loom and the cooking utensils. We notice the home-spun clothes and the methods of preparing them. We notice the tallow dip and compare it with the electric lights of today. We notice the churches, the schools, the vehicles and methods of transportation by water and by land. We notice the small community life and how everything is done in the house and by the community. We visit the lumber camps, the farms, the mines, and various simple types of occupations which are later to develop into great industries. We study the Cotton plant, notice methods of preparing the thread, dyeing it and making it into cloth.

We center much of the work around the Heroes of Colonial days. The ideals of character are presented



Japanese Garden made by Second Grade Pupils, Danville, Ill.

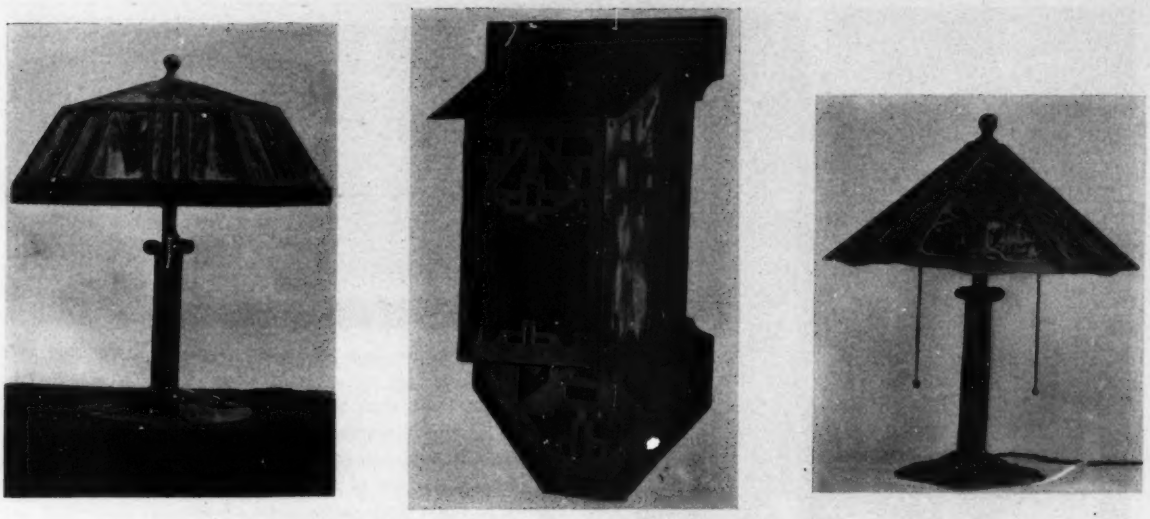
with the hope that the children may strive for heroic traits of the character studied. We study the boyhood of Lincoln and build his cabin, and draw his flat-boat. We study the life of Washington and construct his Mt. Vernon home and make some of the old fashioned furniture.

In the photograph is shown a sand-table construction by third-grade pupils. Here "Alice of Old Vincennes" comes back from the land of memory and signals the soldiers from the top of the fort. Here is the cleverest kind of a fort scene, around Old Fort Vincennes, showing the block houses, the near-by farmhouses, the river, and the Indian Village in the distance.

The photograph showing Historic Boston is not a good one, because the houses look crowded and the Commons are almost hidden. However, this was a splendid historic scene constructed by third-grade pupils. Since these pupils had no sand-table, they spread out green paper on an ordinary table, and used cardboard boxes, which they covered with paper to represent hills. They represented the New Capitol surrounded by old buildings. White paper, tinted blue, was used to represent the Ocean.

The Panama Exposition was a special problem in construction worked up according to models, pictures, and descriptions of the actual drawings made by the designing artist. This was done by a third-grade class, with some assistance from seventh-grade pupils who were taking Industrial Art under the direction of the third-grade teacher. The tables were covered with cardboard, and sodded with actual grass. The various industrial buildings were constructed and placed as designed by Jules Guerin, the artist. The buildings of the various countries were such as would be typical of the people represented. The whole exposition was very attractive, and the pupils certainly learned a great deal about architecture and design.

Historic Boston constructed by Third Grade Pupils, Danville, Ill.



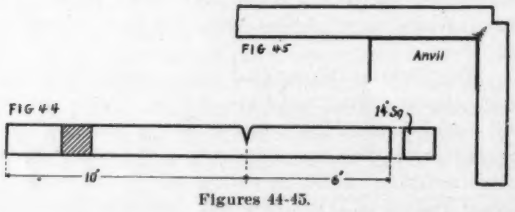
Articles Designed and Forged by Mr. Googerty.

PRACTICAL SCHOOL SHOP FORGING

Thomas Googerty, Pontiac, Ill.

(Third Article)

A corner weld made by using heavy stock, for example one and one-fourth inch square, is to have a square corner by welding. See Figure 44. With the dimensions six inches from one end, the bar is heated and cut about half thru from one side with a hot chisel. The bar is then heated and bent to about a right angle, as shown in Figure 45. A piece of three-quarter square stock is cut on four sides as shown in Figure 46. This



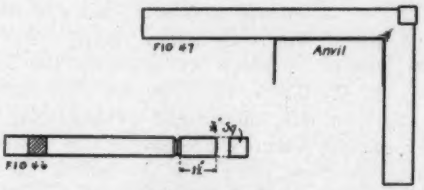
Figures 44-45.

piece is welded into the corner as shown in Figure 47. The heat is separate, and the smith takes both pieces to the anvil when hot. He places them in position as shown in the drawing, the helper doing the welding. The long part of the bar is then broken off, another heat is taken and the corner is finished up by the smith.

Brazing.

Iron and steel can be fastened together by brazing. In doing this, the ends are tapered or dove-tailed together and bound with wire or a rivet to hold them in position. They are then placed in the fire and brought to a red heat. Some borax and spelter is put on and the heat is raised until the brass flows. The work is then taken out of the fire and let cool; then it is finished with a file, or by grinding. Spelter is an alloy of copper and zinc, and may be purchased from the dealers. Brass wire may also be used in brazing, and sometimes copper.

In teaching boys forging, the writer feels that it is a waste of time to give a beginner little pieces to make, such as staples, hooks, etc. A boy cannot learn to handle his hammer, or to heat a piece of stock by



Figures 46-47.

making small things. What the beginner in forging needs is some work that he can swing a hammer on without danger of spoiling it. Very few boys on entering a shop can handle a hammer, and they certainly do not learn about heating metal in a forge, by working at staples, etc. The first exercise should be a fagot weld.

Exercise No. 1.—Fagot Weld.

In doing this, two pieces of iron ½" square and 6" long are used. The instructor demonstrates the welding of these two pieces before the class. In making the weld, one piece is laid on top of the other and both are caught at one end with a pair of tongs. The tongs should fit the pieces nicely; a ring is placed over the ends of handles to bind the jaws firmly on to the pieces. A heat is then taken on about one-half of the length of the stock; the pieces are welded and at the same time drawn to ½" square. The pieces are now turned around in the tongs and the balance heated and welded. While drawing stock always have the bar at right angles with the long side of the anvil. If the bar is not so held, it will twist on the slightly rounded face of the anvil.

There will be more or less iron burned by the boys in making this fagot weld; but this is necessary, for a boy can never learn how to work iron until he can heat it properly. He must over-heat and burn iron in order to understand the heat limitations of the metal.

After the weld is made and the bar drawn to the original size, the ends must be squared by upsetting them. The bar when finished should be ½" square thruout its length, and straight with the ends squared.

It is then formed into a loose ring by hammering it over the horn of the anvil and not on a ring mandrel. In forming the ring, the ends are upset on an angle, so

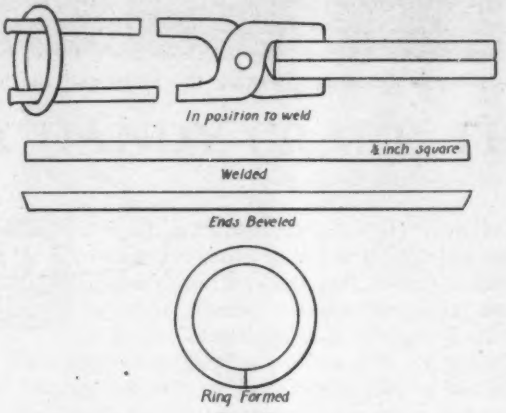


Fig. 48.

that when bent into ring form, they will fit together nicely. See Fig 48.

Exercise No. 2.

This exercise will be made in the same manner as number one, excepting that the bar is finished to 7-16" square, and a ring is turned on each end. See Fig. 49.

The eye is formed by heating and hammering it over the horn of the anvil, giving it the shape as shown

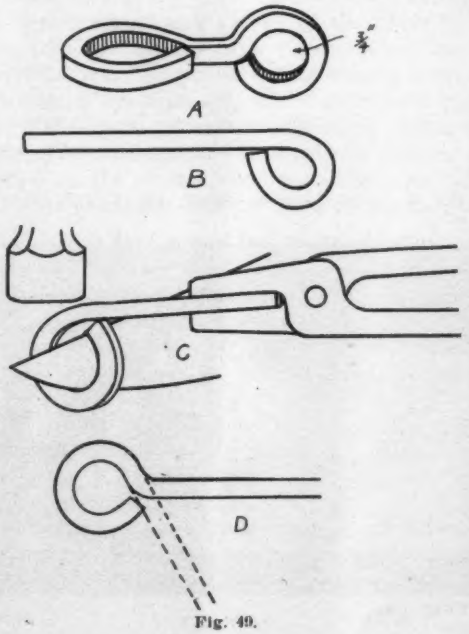


Fig. 49.

at B. It is then re-heated, set on the horn of the anvil and hammered close to the eye as shown at C, which bends it central with the shank as shown at D.

In turning loose eyes of any size stock or dimensions, on the end of a bar, the ring is first turned into

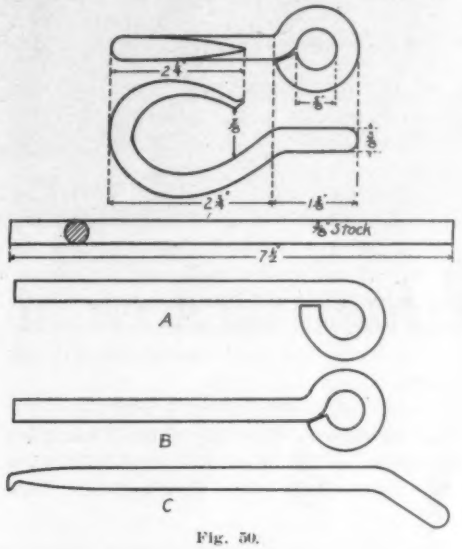


Fig. 50.

a circle of the desired size. It is then sprung central with the shank. With this method, no figuring of stock is required.

Exercise No. 3.

In making a hammock hook, the stock should be soft steel, which may be purchased for about the same as iron. It will stand the bending strains better than iron. The size of the stock is 7½"x⅜", round. The end is heated and a loose eye formed. The other end is drawn to a taper with ¼" of the end turned up as shown. See drawing of hook, Fig. 50, and the different steps in forming the eye at A, B and C. The hook is formed over the horn of the anvil as shown in Fig. 51. Fig. 52 shows the finished hook with a dotted line drawn thru the center, indicating where the pull should come. In

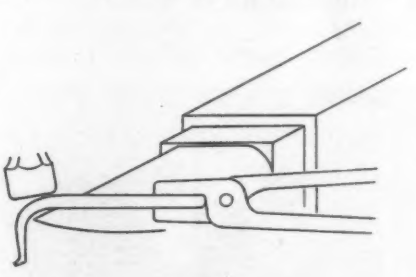


Fig. 51.

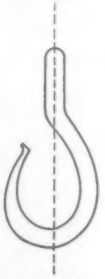


Fig. 52.

Fig. 53 is shown a common fault when turning a loose ring at the end of a bar, in not bending the extreme end first. Notice Fig. 54, where the end is bent as it should be.

The expert worker in iron is very careful not to hammer mark and destroy the section of a bar. One should remember that bending a ring or iron hook is

simply holding the bar on the horn of the anvil and striking the part that protrudes past it. Never strike

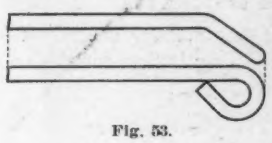


Fig. 53.

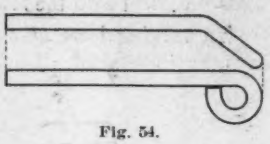


Fig. 54.

the bar when it is directly over the horn. This does not bend it, but makes a dent in the stock.

Finishing.

To finish wrought iron, all of the scale and dirt should be scraped off with an old file while the piece is hot. When the iron is cooled, linseed or machine oil is rubbed on. If the work is held over the smoke of the fire and then oiled, it will take on a darker color. Never paint iron work. This destroys the texture of the metal. Do not file work bright. It should be dark—filing is not forging.

Exercise No. 4.—S-Link.

Fig. 55 shows a drawing of an S-Link, which is used to splice broken chain. In Fig. 56 is shown the length and size of the stock. The ends are drawn to a

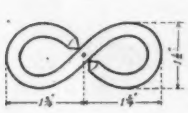


Fig. 55.

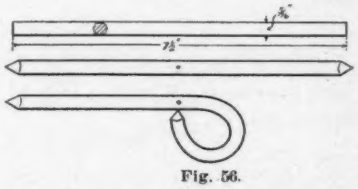


Fig. 56.

short point and the center of the bar is marked with a center punch. One-half of the link is then formed, bringing the point at the center punch mark and using one-half of the bar. This is a simple link to make. The only thing to be careful about is to not destroy the section of bar with hammer marks. This may be avoided if one does not strike the hook directly over the horn of the anvil, but to one side of the horn. See Fig. 57, the correct blow.

Exercise No. 5.

Fig. 58 shows a drawing for a welded Eye Pin. The eye may be made any size for practice. In making the ring, the bar is heated in the center and hammered

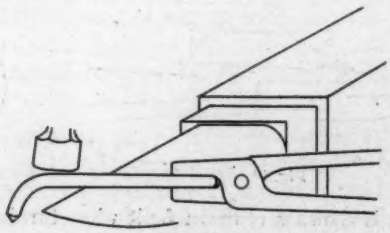


Fig. 57.

over the outer edge of the anvil, as shown in Fig. 59. The piece is now turned end for end, and jogged down again with the ball of the hammer. See Fig. 60. The piece should now look like the drawing in Fig. 61. The center of the piece is heated and hammered over the horn of the anvil to make the ring round and to bring the shanks together. See Fig. 62.

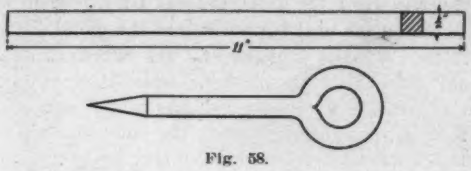


Fig. 58.

In welding, the piece is caught by the ring with a flat pair of tongs. See Fig. 63. It is now placed in the fire so as to get the heat close to the ring. The tongs are then removed, until the piece reaches a white heat; the piece is again caught with the tongs and the heat

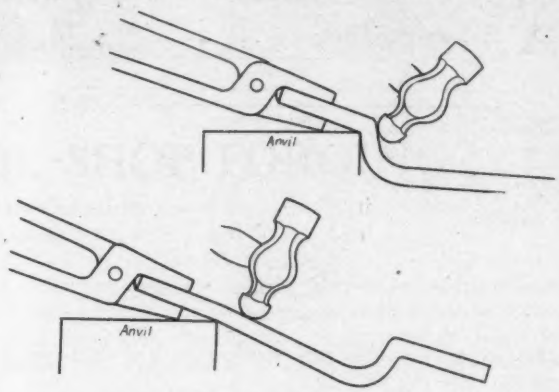


Fig. 59 (above). Fig. 60 (below).

raised. It is taken out and set on the edge of the anvil and hammered as shown in Fig. 64. The first blow struck is close to the ring in order to weld that part first.

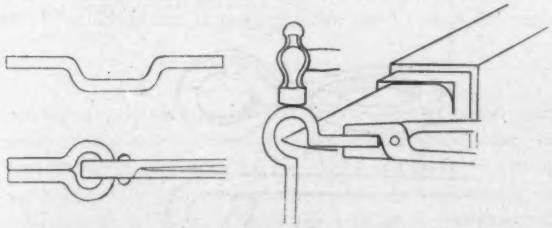


Fig. 61 (above). Fig. 62 (right). Fig. 63 (left, below).

If it cannot be all welded in one heat it should be reheated at once. Do not hammer unless the heat is a welding one, as the stock will become too thin before

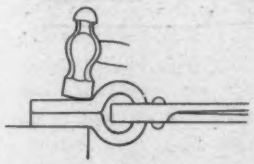


Fig. 64.

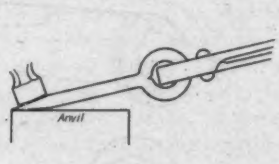


Fig. 65.

it is welded. Do not heat the tongs red as this destroys them and the piece cannot be held with hot tongs. When the ring is welded, the end is drawn to a square point. See Fig. 65.

Fig. No. 1. Tracing a Design.

Fig. 2. An Original Design by an Eighth Grade Student.

A HANDY-CRAFT THAT IS WORTH WHILE

Richard Ernesti, State Teachers' College, Greeley, Colo.

TO reach into the life of every man and woman, to make us richer in soul life and to get us to that great goal, that is so hard to attain, namely "Contentment today and a better tomorrow" is a mission of Art. We will always have the poor with us. To compensate those that are not rich by giving them joys to balance the differences is one of the social problems and the solution surely lies strongly with Art.

* * * *

Most of us are familiar with some of the history of Art Glass Windows, as well as the process of producing the same. The design to fill a certain window and to fill a certain purpose, is first made, then this is enlarged after the manner of the old Fresco Painters in shape of a cartoon and done in duplicate. One of these cartoons is cut into pieces on the lines of the leadcame by means of the Frye Scissors, which cuts just the width of the leadline from the design. The pieces cut out are all numbered to match the numbers of the other or duplicate cartoon, which lies upon the table. And these pieces cut out now serve as patterns by which the colored and art glass is cut to shape and to fit into its place as per the design on the other cartoon upon the table. The stained glass pieces are then put together and the leadcames that have been placed between are now soldered, to make the window a solid feature for the service it is to render, when it is put into Church, Hall, or Residence.

* * * *

For some time, we have been doing in different parts of the United States in public schools and elsewhere a handicraft, which for a better name we will call Transparencies, and which have done service in many cases for the stained glass window. Any man, woman, or child, with a love for beautiful color and form can make these and have them as a lasting joy in the home, the schoolroom or the church. And the character of a fine window is surely attainable by this process. One might almost say that anything done in beautiful stained glass can, with patience and perseverance, be accomplished in these transparencies.

Let it be understood that the craft is not claimed as anything new. This art was practised way back in the olden times of Italy, before the days of glass, when oiled papers and skins were stretched across the window openings and decorated in color schemes. Perhaps we have worked the thought out a little differently since first this Craft came into use in some of the public schools of this country. Suffice to say we have here a craft that is

Fig. No. 4.

Fig. No. 5

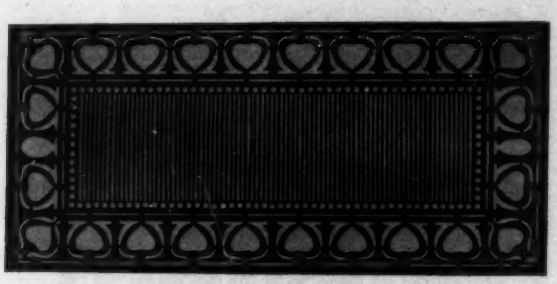


Fig. 3. An Original Design by a College Student.

Fig. No. 6.

not only educational and interesting, but from the standpoint of expense it is within the reach of every one. It is an occupation full of spirit and possibilities both for the grades and the High School, the College, and the Home. There are almost no limitations to the possibilities in expression of picture or color.

The materials are cheap: Cardboard, Crepe or Tissue Paper, Paste, a pair of Scissors, a sharp pointed Knife, and a sheet of Zinc to cut upon, that is all. Yes, there is one more thing—the love of the beautiful. And this very work, as the picture grows from under the hands of the interested student and inspiring teacher, will bring on that very happy and desirable microbe "appreciation."

And one other great factor must be considered and this is, that the less rich have here a great advantage, namely, while the rich man may place his expensive Art Glass decoration, which he will not change again without some expense; we can replace or change our color scheme or picture ad libitum with every season or occasion to fit new wall papers or other interior decorations that may come with the change of years, seasons or of residence. For the cost of these transparencies is infinitesimal, a good sized window 40″x40″ costing not more than fifty cents.

* * * *

The illustrations shown in this article are examples of students' work in the State Teachers' College of Colorado, which reproduced in monotones lose much of their richness by the omission of the colors. These designs are now in place and they serve well; some as groups in the chapel windows 2′ 6″ x 6′ in size, others as transoms in the schoolrooms embellished with quotations as shown in cut Number 7. Cut Number 3 represents a transom-grill to match black door handles, hinges and electroliers. The grill is fitted into the transom, and a pane of glass is placed over it to make the cardboard grill lie smoothly and to prevent curling.

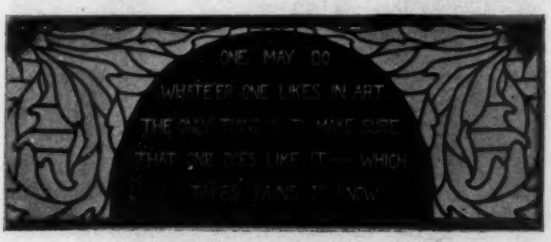


Fig. No. 7. Original Design in Sea Greens by a College Student.

Still another effort in the line of transparencies is shown in cut Number 12; A window screen, partly unfinished, in the background. Here the whole window, size 29″x36″, is on one sheet of label vellum cloth. Lead-lines are drawn in indelible ink with the lettering pen. The color design, face, hair, and clothing, are executed in water colors. A fine effect of ground glass is thus produced. This can be still further enriched by building up with tissue papers on the back.

Process of Execution.

First of all the design to be used must be decided upon and worked out. It must fit the space and be fitting to the purpose. For instance, in a chapel the windows, cuts Numbers 10 and 11 would do good service. In a dining room cut Number 2 would be an appropriate selection. The design must be adjusted to the frame of the window by a frame made of wood strips one by two inches, with the one inch width facing in and outward, and the two inch width to be used as depth. This gives plenty of room within the frame to build up subsequent color effect that may be desirable or necessary to obtain.

The design is drawn upon the cardboard, in pencil first, and when fully acceptable is done over in ink or black water color with lines ¼″ or ½″ in width, according to the size of the design. If the window is small the came of leadstrip does not need to be so wide as in a larger window. Cut Number 1 illustrates the method of going over the pencil drawing with either a brush or a lettering pen and indelible ink. It is self-evident that all lead lines must be of even width and clean in execution. A wavering or uneven line would destroy the effect of beauty we strive for. The material best suited for this skeleton upon which all the transparent effects are built up, is, what is known as "tagboard." This comes in sheets 20″x36″ and when effects larger than this are to be done, it is well to divide the wooden frame by cross-bars, as in cut Number 8.

As this window is 4 feet 2 inches by 5 feet 9 inches, it was necessary for strength to build up the wooden frame in this manner. When all lines have been done in ink, we proceed to cut out all the white spaces left between the lead lines with a sharp pointed knife, as shown in cut Number 2. The tagboard should be laid on a sheet of zinc during the cutting process. This gives clean edges and prevents the knife from slipping. The final effect is similar to the grill, shown in cut Number 3.

Fig. No. 12.

Fig. No. 8. Original Design by a College Student.

We are now ready for our color effects and here the students have a chance for the expression of good taste based upon study, proper appreciation, and observation of nature and harmonies. Patience is needed, but it bears fine fruit, for the results of these effects are very pleasing if we get the right colors and balances. The under side of the lead lines are now covered with paste as needed, and the crepe or tissue papers fastened thereon. It is a matter of indifference whether you follow the plan of the art glass maker and cut out your patterns before you begin to paste them on, or whether you paste on irregular pieces of right color and trim them off afterwards.

Personally I prefer to cut all in the right pattern at once before I do any pasting, but many of my students both in the grades and in the college have done good work by following the other way of procedure.

Perhaps right here is a good time to say something of the color effects for our transparency as seen from the front, by direct light upon it and not as a transparency. At times these screens are seen by inner or artificial light; and in order that they may look well at such time, it is necessary to use tints of paper on the first pasting that are not too strong, crude or contrasting. In Numbers 8 and 9, for example, I would use for the facing of sunset sky, Yellow Number Y. 2, for trees and foliage, Green Number G. 6, for meadow, Number G. 5, and for the road, Brown Number Br. 2.

These are the standard numbers you will find both on the sample cards of the crepe paper and on the roll. You will find that these colors would not offend when not seen as a transparency. When you work for the transparency effects you may add behind these any strong colors that may be needed to produce the desired effect.

The colors may be tried one after the other, by holding them behind the facing. To do this conveniently the transparency should be fastened to the wooden frame with glue, paste, or tacks, and one chosen color after another held behind the facing and moved closer or farther back in the two-inch frame to study the effect. The frame is of course placed so the light shines thru or towards the designer.

It is best in most cases to cut the pieces of paper, that are to serve as means of producing deeper color effects into the right shape before applying them. If lighter effects are wanted, as for instance in a mass of foliage, or the top of a mountain range, these respective pieces of paper are pasted onto the lower leadlines and the upper part of the crepe paper is pulled slightly away to obtain the desired light. This was done in the finished windows of cuts Numbers 9, 10, and 11, and as in the flowers and buds of these same windows.

Sometimes it becomes necessary to paste a whole strip across the frame, as shown in cut Number 5. Remember that in many cases the second layer of paper is put further back than the first facing of crepe or colored paper. These pieces can be supported away from the lead lines on small pieces of tagboard attached in the rear of the leadlines. Thus two or three, and even four layers of paper can be placed back of each other. In stained glass windows one often sees three or four layers of glass fired together to get great luminosity.

Fig. No. 9.
Original Designs by Senior College Students.

Fig. No. 10.

Fig. No. 11. Composition by Senior Student from Window by T. S. Brydone.

As a final finish it may be desirable to place back of the whole effect one sheet of one color as in the case of a sunset effect, when a full sheet of orange paper will bring the whole scheme into harmony.

In the end the entire piece of work is backed with full sheets of white crepe or tissue paper. When the transparency is finally put into place this side goes out towards the street or court, and gives it a finished appearance like ground glass. In cases where we have placed large windows like cuts Numbers 8, 9, 10, and 11, which are reproductions from our chapel windows, we have covered all the window with glass on the inside to prevent injury to the paper from curious fingers. Thus all the paper lies securely between the regular sashes in the windows and the glass over it for protection. Such windows, where not exposed to too much of a southern sun have served for 10 years and are in good shape yet, showing very little loss of color by fading. The faces, hands, and feet of figures in the windows of cuts Numbers 10 and 11 have been done in water colors upon Label Vellum Cloth Number 8. This cloth takes water colors beautifully. It is important to get the right depth of color in the first wash of color and to apply the wash quickly without moistening the surface beforehand. The cloth is translucent like ground glass, and can be pasted to the foundation quite as easily as the crepe paper.

WORKMANSHIP when separated by too wide a gulf from fresh thought — that is, from design — inevitably decays, and, on the other hand, ornamentation, divorced from workmanship, is necessarily unreal, and quickly falls into affectation.

W. R. Lethaby

PROBLEMS IN DESIGN

Bonnie E. Snow
(Second Article)

DESIGN is the selection and arrangement of lines, shapes and tones, in suitable materials, for purposes of use and beauty. In the previous lessons we found that shapes adapted from nature could be used decoratively, if certain principles of design were observed in their arrangement. A very large proportion of the decorative ideas employed in textiles, wall papers and indeed in all manufactured articles, are based upon nature forms. Sometimes these forms are used naturalistically, and poor design is the result. Sometimes, as in our very simple exercises in Problems I to IV, the forms have been modified and adapted to such an extent that principles of arrangement are established, and a beautiful and harmonious effect is obtained. It is the aim of these lessons to emphasize the idea that any shape, whether natural, objective or abstract, can, if properly treated, be used as a design motive.

At first we must expect to use shapes that are suggested by objects around us, but later we shall find great pleasure and profit in inventing our own shapes or units, and in bringing these units into conformity with the principles controlling design. Let us take for example the shape of a common object not too difficult in drawing for a sixth-grade class. The beanpot does not at first sight suggest a decorative use; but a glance at the interesting design for an advertising placard, given in Fig. 1, will show one way of solving such a problem.

In planning this arrangement a 9″x12″ sheet of gray squared paper was selected for the background. The first thing that was determined was the size of the whole placard. A length of 47 squares was decided upon, and a width of 29 squares. A line was drawn defining this shape. Then an upper rectangle was planned two squares from the outer line. The line of this rectangle was made one square in width.

Let us assume that the designer of this placard had definite requirements to fulfill; he was obliged to use certain specific lettering, and a decorative treatment of some earthenware form. He, therefore, planned his spaces with reference to these requirements. He made his main line of lettering three squares high, and placed the line three squares down from the top, and two squares in from either side. Observing these limitations, he planned the width and placing of his letters.

Fig. No. 2.

The shape of the beanpot was selected for the decorative unit, with the thought of reversing the shape to form a symmetrical arrangement. A stencil was cut from a two-inch square of manila paper (see Fig. 2) and the unit was repeated reversed, as shown in the illustration. The remaining lines of lettering were next planned. The design was then ready for the treatment in color.

Two-color tones were put on with colored crayon. The border and the upper and lower lines of lettering were filled in with an even tone of orange crayon, and the decorative units and the balance of the lettering, with an even tone of brown, which is a shade of orange.

Fig No. 1.

Problem V—To Design a Poster Announcing a Sale of Housewares.

On a 9″x12″ sheet of gray squared paper plan an arrangement of lettering using with it some still-life shape. Let the choice of still-life and the lettering be your own selection. Work out the problem after the manner described above.

A problem such as the above is suitable for a grammar grade, or for high-school classes. It may be simplified for sixth or seventh grades by omitting all but one line of lettering, retaining, of course, the decorative idea.

INDUSTRIAL-ARTS MAGAZINE

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EDITORIAL

THE TEACHING OF THE INDUSTRIAL ARTS.

THE story of the old German clergyman, who would pause several times during a discourse and say, "Vell, now, ve vill go back to de foundation of de vorld," fits our case. We shall be constantly going back to the first essentials of any adequate school or system of education, namely, the wisdom, skill and enthusiasm of its teachers.

Teaching is the finest, and by far, the most difficult of the fine arts. In view of this difficulty and of the lack of permanency in the membership of the profession; and in view of the improper or inadequate preparation and of the frequent lack of sympathetic, whole-souled, absorbing interest and enthusiasm, to say that, on the whole, teaching is rather poorly done, is to put it mildly indeed. However, the teachers must not be expected to bear more than their share of the blame, since the handicaps are so numerous and so aggravated.

The prime difficulty in discussing the merits of the different methods, courses, etc., in Industrial Arts is that the personality, the vision, and the enthusiasm of the teacher and the extent to which these influence and enrich such methods and courses, cannot be satisfactorily estimated. We have all seen those rare marvels of power and influence in the classroom who could make a success of almost any course, system, or method. Such people refuse to become slaves to system or routine.

It is only when we undertake to reduce the methods of such inspiring teachers to formula and routine and to eliminate the personality of these teachers, that they become pitifully lifeless and uninspiring. This prime defect is one of the many fundamental weaknesses of the "canned courses" in Manual Training which are now clamoring for recognition.

To the superior teacher, an hour with the class is an hour of joyous participation in real life, of bringing the resources of past experiences and achievements to the attack of new problems. To the unsuccessful, uninspiring teacher, the hour is too often sixty long minutes of tasks to be imposed, tasks to be done; of endless admonitions to do this and not to do that; of suppression of individual thought and initiative; of marks of P or E plus, of hasty dismissal and a sigh of relief with whispered but emphatic remarks in approval of the doctrine of total depravity.

The spirit, the breadth of view and the skill of the teacher will determine whether a single boy of the class will play truant or drag himself in at the last stroke of the tardy bell with a dismal prophecy of an unpleasant hour of wasted time, or whether every boy will come to the shop quickly and happily with the feeling that there is something vitally important to be done.

THE APPRENTICE PROBLEM.

IN the report of the proceedings of the First Institute of Continuation School Teachers in Wisconsin, Mr. Warren E. Hicks, Superintendent of Industrial Education, makes a statement which should be remembered in connection with the continuation schools. He says: "We should be careful not to mix up in our talking and thinking the apprentice, permit and evening schools. The apprentice has a contract to learn an occupation or trade. The permit pupil has no such contract and the instruction may be different. All-day industrial and the evening pupils have nothing to do with employers so far as the work they are doing is concerned.

"Only about three hundred apprentices have come to us. This is a lamentably small number. Only about twenty-four employers have given us this confidence. There were about six thousand permit pupils, about five hundred all-day industrial pupils and about six thousand evening students."

SELF-SUPPORTING SCHOOLS.

THE publication of statements to the effect that certain public schools are becoming self-supporting, thru the manufacture of marketable products by their Industrial departments, seems ill-advised. If the purpose is to advertise the school system or officials, that result is accomplished; but if the purpose is to contribute to the solution of the problem of Industrial Education, the results are far from beneficial.

Almost anything can be proven by figures, if the right fellow juggles the figures. When a statement is made to the effect that a school is self-supporting, a statement of the amount of money annually appropriated for that school should be published. It is to be regretted that there is not some modification of the pure food law requiring a person to state what proportion of his printed statements are superheated atmosphere and fiction.

A taxpayer or member of a school board reads a statement made by a superintendent of schools in another city, that his schools are self-supporting. Immediately he wants the schools in his community to support themselves and insists on reducing the appropriations for school purposes. In this manner these statements are working a direct hardship on schools and schoolmen, and are detrimental to the best interests of public education.

For years schoolmen have been urging legislation to prevent child labor when children are paid for their work. Now they propose to go into the business themselves and employ boys and girls for the purpose of manufacturing, but do not pay the children. If the boys and girls manufacture a marketable product they should be paid for it.

To "make both ends meet" manufacturers find it necessary to practice innumerable economies, work nine or ten hours a day, employ experienced superintendents and foremen, purchase the best labor-saving machinery,

and devote their entire time and all of their energies to manufacturing. The man who can make a profit by working boys and girls only a part of the time, and have that work educational in character, ought to go into the manufacturing business. He will not need to advertise himself there. The business world is wanting such men.

But why should we expect schools to be self-supporting? Why put education on a dollars-and-cents-basis? If some one can show that the hogs of this country can be made healthier, heavier, or to grow faster by the expenditure of money, the money will be quickly forthcoming. Compare the appropriations for the U. S. Department of Agriculture with those for the Bureau of Education. When we are considering the welfare of boys and girls, why should this country be niggardly?

A DILEMMA.

ONE of the principles adopted by the Indiana State Board of Education to assist them in working out the problem of Vocational Education for the State, is as follows:

"In general, special Vocational training should not begin much before the age of 16, *because the child is not well enough developed before that age for work in any skilled industry.*"

It is extremely probable that a very large per cent of the children in Indiana leave school at the age of 14 as they do in other states. The State gives the child a permit to go to work at the age of 14 and gives an employer permission to employ him, yet the State says "the child is not well enough developed before that age for work in any skilled industry."

If the child is not sufficiently developed to enter a skilled industry, he is certainly too immature to enter an unskilled industry.

If the boys and girls are allowed by law to leave school at 14 to go to work in blind alley occupations, the State of Indiana will find it a difficult task to induce them to come to a vocational school at the age of 16. The time for the school to train children is while the children are in school, not after they have entered unskilled industries.

Either the law or the principle needs modification.

THE CITY MUSEUM AND EDUCATION.

A PROMISING feature of the general movement toward making better use of the facilities of our cities and towns for practical and efficient education, is the aroused sense of responsibility on the part of museum officials.

Our museums are rapidly changing from unused collections of antiquities to efficient bureaus of information and instruction. As the hours of labor in shops and factories are shortened the hours of service are increased by these institutions that can make leisure profitable.

There has been much development of late years in this direction, and now most of the museums of the larger cities make systematic efforts not only to supply opportunity for study, but to incite interest by giving instruction. Boston, true to her traditional culture, has led in this movement. At the Boston museum special lectures are given to school pupils of the city, and to the public, at which those in attendance are led to express themselves and ask questions. Tutors are also sent out to the schools from the museum with traveling exhibits.

The Metropolitan Museum of New York furnishes information for teachers concerning historical and art subjects relative to its collections, and lectures are given before classes of school children illustrated by collections in the museum.

The Toledo Museum cooperates with the schools of the city effectively. Every day during the school year at the hour of three a talk is given to school children and each spring the museum rooms are devoted to an exhibition of children's work in drawing, design, manual training, domestic art, and domestic science.

The Detroit Museum offers free popular lectures on certain days, including Sundays.

The Carnegie Museum of Pittsburgh sends out photographs of its collections to schools.

In Philadelphia, teachers are allowed the free use of the collections for class instruction.

In Syracuse, the school children are encouraged to visit the museum, and are led to vote for their favorite pictures. These votes are later discussed in class.

A hall in the Art Museum of Chicago is in daily use for school instruction and teachers with their classes are admitted to the museum free at all times.

In Portland, the Sweat Memorial Art Museum is seeking to cooperate with the schools of the city, and state, to further Art Education.

The best of the efforts on the part of museums are directed toward awakening and promoting interest. It is not enough to keep the museum open if no considerable number make use of them. At the Museum Conference of Mannheim, Germany, in 1903, the subject of bringing the public museums in closer touch with the working classes was considered.

These developments are especially interesting in view of the possibility of the museums becoming even more useful than at present to rural communities, where the best art of the world is little known, or appreciated.

It may never be practicable to send original collections from museums to rural communities, but in this day of effective reproduction of pictures by photography, and of excellent models in plaster and metal, there is no reason excepting the one of expense, in the way of a general dissemination of the best design of the world's history.

The circulating department of South Kensington Museum has set a precedent for public institutions of America in this important field. This department is a section of the art division of the Council on Education. It supplies to museums and schools over the Kingdom exhibits of framed textiles, drawings and reproductions of works of art in such form and sequence that the development of the arts and industries can be studied. The great museums of our large cities may become the centers from which collections can be circulated thru the states.

Our industrial product and our increasing instruction in industrial design demand that, our pupils be supplied with examples of the best of the world's productions.

THE SIGNIFICANCE OF A NAME

To the Editors:

I note, and with great pleasure, that you call your new periodical The Industrial-Arts Magazine. I take it that it has to do with all of those arts relating to the changes in materials by which they are made into finished products, thereby becoming both more useful and more beautiful for the satisfaction of man's needs. This includes those changes in woods, metals, clays and other earth materials, textiles, food materials, and so on, usually called broadly, manufacture.

Of course, we all know that these changes were once made by hand. We equally well know that most of them are today made by machine processes. Much—perhaps most—of that we should know today about these transformations of material is not gained alone thru hand work of the kind that once would have been quite an adequate means to the industrial processes of those days. So much work today is done by automatic machinery that relatively few workers need a very high grade of manual dexterity. Henry Ford is quoted as saying that he can take a sweeper from the floor of his automobile plant, and if he is at all apt, he can be taught to make some part of the automobile in two weeks—"become a mechanic, a specialist, for us," to use his own words.

Manual training grew up at a time and in countries in which hand production was much more extensive than machine production. It was of cultural value so long as it related to the real life of the people among whom it was practiced. But can a thing continue to have very large cultural value after it has become relatively rare in everyday life? With the methods of production of today, manual training loses much of its claim to educational values if organized on its former basis. Today we call experiences educative if they provide knowledge or information, attitudes, habits, or appreciations that make us act differently because of them. Can we not get more of all of these in studying the industrial arts as they are practiced today than by confining ourselves to the days and methods of the handicraft period?

The values claimed for manual training nowadays are nearly all *disciplinary* values. They rest upon a psychology quite generally abandoned by present-day psychologists. Glance thru the pages of the first issue of the Industrial-Arts Magazine and note how the defences of *manual* training are in nearly every case because of its alleged value for *mental* training. In most cases, the justification rests upon a disciplinary conception alone. Altho the work done under the term manual training has changed greatly in recent years, the term seems to persist, and is often a source of much trouble in thinking and speaking of its content. The Western Association of teachers in this field have, for a number of years, used the term manual *arts* instead of manual training.

The proposition which I wish to offer is, that the use of the term *industrial arts,* is much more desirable than either the term manual training or manual arts. Do *manual training* teachers wish to be set off as a class of teachers different from those whose work is *mental training?* If most of the industrial work of the present day is done by machine operatives, can a method of industrial work that has largely become history commend itself very highly as of either very much practical worth or educational value? The term industrial arts would not limit us at all in our selection of material on an historic basis. We could select those things of value in developing a conception of the full meaning of industry today, or in developing technical control, from any period of history or from any people. Making a knife for shaping pieces of wood out of a piece of flint is just as much an industrial art as making the most highly complex planing machine of today, as is also the shaping of the wood by the use of the one as of the other.

I do not at all imply that this change of name means a reduction in the amount of hand work. Indeed, I feel sure that under the enlarged content and the increased appreciable values of the work as made to fit the needs of today will call for more hand work—more participation in industrial processes—than we have had hitherto. And on this basis we can justify to the satisfaction of all concerned the use of more time, because we can point definitely its values in making more intelligent consumers, more intelligent citizens, and more capable producers as a result of the work.

Industrial arts is a content term, not a disciplinary term. We would not think much today of a man who would propose a school course in *memory training,* or *imagination training* or *reasoning training.* We get all of these kinds of training, but we get them thru *content* subjects in which they are vital parts of the study, just as is *manual training* vitally an important part of industrial arts. Reduced to its real meaning, manual training is establishing nervous connections between the sense organs and muscles, making for muscular control. Of course penmanship is a form of manual training.

Industrial arts is not used at all as synonymous with industrial education. Industrial education is a form of vocational education and training, just as is commercial education. Industrial arts is not to be thought of primarily for vocational purposes, altho its appropriate development would go far toward providing a foundation for vocational specialization, and especially as a basis for vocational guidance. The large claim for industrial arts is its importance in making for intelligence as consumers, and intelligence as citizens in an age in which industrial life is so prominent a factor.

Which shall it be, *industrial arts,* a subject almost unlimited in possibilities for rich thought content of fundamental importance to everyone in our day, or *Manual training,* a subject, which if it remains what its name really signifies, is devoted merely to the development of control of the hands—*industrial arts,* a term which suggests mental content and training using the hand work as a most important means, or *manual training,* suggesting something not at all largely inclusive of mental elements? Are not our teachers of the industrial arts just as much concerned with the mental development of the children as with their hand training? The Industrial-Arts Magazine and its readers can do much to give reality, worth, and dignity to a school subject called industrial arts, possessing all of the values of manual training and much not appropriately included by that term. Is there not some significance in the appropriateness of a name?

Frederick G. Bonser,
Director Industrial Arts,
Teachers College, Columbia University.

EDITORS' NOTE—*The editors of the* INDUSTRIAL-ARTS MAGAZINE *welcome at all times, criticisms and discussions of articles, illustrations and news matter which appear in the magazine. Communications to receive attention must be signed in all cases. No letters will be published without the permission of the writers.*

ITEMS OF INTEREST

A NEW ASSOCIATION.

AFTER several preliminary meetings, a new educational association was organized at a meeting held in the Chicago City Club, January 16th. The new organization is to be known as the Vocational Education Association of the Middle West, or the V. E. A.

The objects of the association as stated in the Constitution "shall be to study problems relating to Vocational Education and to bring the results of this study to public attention for the purpose of fostering types of education that will meet the vocational needs of youth and the reasonable demands of industry for efficient workers, while preserving those elements of general education essential to efficient citizenship in a democracy."

The Constitution provides for a board of thirty directors to meet at least five times a year for the purpose of study and investigation; all meetings to be open to members of the Association. Educational committees are provided for each of the following subjects, Commercial Education, Industrial Education, Agricultural Education, and Vocational Guidance. Annual meetings to be open to the public are also provided.

At the initial meeting, a demonstration of the Commercial work done in the Chicago High Schools was given, under the direction of Wm. Bachrach, Supervisor of Commercial Education in the Chicago Schools. The following officers were elected to serve for one year: President, Wm. J. Bogan, Principal Lane Technical High School, Chicago; Vice-President, W. B. Owen, President Chicago Normal College, Chicago; Secretary, Anne Davis, Department of Vocational Guidance, Chicago Public Schools; Treasurer, Wilson H. Henderson, Director Vocational Education, Hammond, Ind.

VOCATIONAL EDUCATION IN ROCHESTER.

THE Report on Vocational Education of the Rochester Public Schools for 1913 gives some intensely interesting facts and figures. The statements made in the report are unusually forceful as they are the result of experience.

It gives a review of conditions of child employment and non-employment and the school standing of the children who leave school. It also gives a complete history of the Shop School with descriptions of courses and the cost of operating each course to date.

The following quotation is worthy of considerable attention: "The experience of the past four years has seemed to demonstrate: 1. That shop classes will attract and hold in school a number of boys who would otherwise leave and go to work.

"2. That many pupils who dislike book work and have made little progress in the regular grades 'find themselves' and make rapid progress in the shop classes.

"3. That the most interesting subject in the curriculum is the shop work.

"4. That the preparation of all lessons in school under the teacher's direction more than outweighs any disadvantages of long hours.

"5. That pupils who have attended the Rochester Shop School have secured better positions and are earning better wages than boys who went directly from the Grammar School to work.

"6. That book work correlated with shop work is much more interesting than when unrelated.

"7. That an eight-hour school day is not too long for boys 14 years of age.

"8. That a summer session is not justified because:

(a) The older boys find it necessary to work during the summer months.

(b) The younger boys may have shop work in the elementary vacation schools.

"9. That pupils upon entering Vocational schools should be given a 'general' or 'try out' course to discover their aptitudes.

"10. That 80 per cent of the pupils who would be benefited by vocational courses do not enter them because of:

(a) Economic pressure in the family.

(b) Parents' ambitions to prepare them for vocations in which there is no manual labor.

(c) Lack of knowledge on the part of parents and pupils regarding the advantages offered.

(d) Lack of knowledge on the part of parents and pupils regarding industrial conditions in Rochester and the training needed for advancement in certain vocations.

"11. That no external incentives, i. e., rewards or the giving to the pupils of the product, are necessary to hold the pupil's interest.

"12. That the strongest incentives to good work are pride in good craftsmanship and the desire to render a service to the school.

"13. That a school which prepares for the skilled trades should not graduate pupils before they are 18 years of age. (Note the small number of boys (14-16) in Rochester manufactories; also the fact that 80 per cent of them are in highly specialized industries.)

"14. That the cost of maintenance of shop schools would be almost prohibitive were it not for the productive work done by the pupils.

"15. That it is practicable to have pupils of the Electrical, Plumbing, and Carpentry Departments undertake installation and repair work, outside of the school, *provided the work is constantly supervised by an instructor.*

"16. That it is not practicable for the teachers of the school to supervise the outside work. Separate 'outside' or 'maintenance' instructors should be employed."

PROGRESS IN INDIANA.

IN a bulletin issued by the State Department of Public Instruction, entitled "Present Status of Industrial and Vocational Work in Indiana," appears the following:

"The State Board had decided that teachers for a Vocational Department or school must be men with practical experience in the vocation for which the school prepares."

"Principles adopted by the State Board of Education to assist them in their attempt to work out the problem of Vocational Education for the State:

"1. That for all professions, vocations or callings there is needed a general educational basis to which the first six years of school work should be devoted almost exclusively.

"2. That some pre-vocational work, including a study of the special branches which underlie a profession or vocation is needed if the learner expects ever to become highly skilled in that work or expects to make a wise and intelligent choice of an occupation.

"3. That this more general study and pre-vocational work must be followed by a period of study and participation in the profession or craft itself if real efficiency or skill in that vocation is to be acquired; that to become a skilled carpenter, the boy must first of all study carpentry and not something else.

"4. That all Vocational work must be done in and thru the instrumentality of the public schools by such an enlargement and extension of its departments and work as shall be necessary to provide real vocational education for all.

"5. That the pre-vocational work carried on in the regular schools and the special vocational work to be provided for in the special departments and schools should not

supplant but supplement and extend the present work carried on by our public schools.

"6. That the pre-vocational work to be done in the regular schools should be taken up in the more fundamental and basic industries which never go out of date and be so conducted as to vitalize the regular school work and give a proper basis for the real vocational work to be done in special departments and schools.

"7. That a helpful preparation for any special training in a vocation would be such a study of the industries and life of our people as will make the workman comprehend his work in its scientific relations and in its historical, economical and social bearings; a study which would tend to give the workman a right view of his trade or work and of his powers and duty as a citizen and a member of society.

"8. That in general, special Vocational training should not begin much before the age of 16, because the child is not well enough developed before that age for work in any skilled industry.

"9. That the problem of Vocational Education should be approached from the standpoint of the welfare of the individual to be trained for useful citizenship rather than from the standpoint of the vocations and industries to be benefited by the skilled workers produced.

"10. That the whole problem of Vocational Education as it pertains to conditions and needs in Indiana be thoroly investigated to the end that a school organization or plan be devised that will solve, in an economical way, the problem of general and Vocational Education in Indiana."

A SUCCESSFUL SHORT COURSE.

A SECOND annual short course covering a period of eight weeks has recently been concluded in the high school at Grafton, N. D. The course is conducted annually during the winter for the benefit of the young people on the farms who are at liberty to attend during the slack season and offers such subjects as Agriculture, Domestic Arts and Science, Manual Training and Commercial work.

In the Agricultural classes instruction was given in seed testing, milk testing, soil analysis and cattle judging. The important subject of silo construction was also studied. The manual training department constructed a number of useful articles during the course; a majority of the problems were of a nature suited to farm use including eveners, saw horses, ladders, seedcorn racks and milk stools. Forge work was given as a means of teaching the use of the small hooded forge in common use among farmers.

Among the girls a great deal was accomplished in cooking and sewing. These classes are held twice each week in each subject and the last day (Friday) is devoted to a discussion of problems involved in farm housekeeping.

Commercial subjects offer opportunities to all students and include farm arithmetic, bookkeeping, computation of the value of farm produce and other subjects of value to the farmer. Such practical studies as cost of fencing, capacity of bins and silos, rate of profit from crops, etc., are taken up. The course ends with a farmers' institute characterized by a strong program, a large attendance of farmers and a luncheon served by the girls of the domestic-science classes.

The annual short course is offered free to all persons 14 years old or over and graduation from the eighth grade is not a prerequisite. Students who live at a distance are obliged to board in town during attendance, but those who are able to travel back and forth are enabled to do so thru the convenient arrangement of the daily program. At the completion of the second year, students doing satisfactory work are considered as graduates and are presented with a certificate of work accomplished.

R. E. B.

LABOR AND INDUSTRIAL EDUCATION.

THE AMERICAN FEDERATION OF LABOR, at its annual convention in Seattle, November, 1913, passed the following resolution:

"WHEREAS, The American Federation of Labor has on divers occasions placed itself squarely on record as favoring Vocational training when properly afforded under competent supervision, and under such conditions as will make the instruction imparted serviceable to the boys and girls of our country who look to and depend upon the public schools for the educational advantages they must have in order to succeed in the struggle of life; and

"WHEREAS, In many parts of the country high-school instructors are arranging so-called short courses in mechanic arts and crafts, to be taken by the student in connection with the cultural training that is provided by the high-school course, thereby depriving the student of the benefit possible to be obtained thru the application of full time to the cultural studies and giving him worse than nothing in return for the time expended in taking the so-called short course in Manual Training, by reason of the fact that the time spent in study of the mechanical arts is too short to provide even an insight into the fundamentals of the processes of whatever craft is involved; therefore, be it

"RESOLVED, By the American Federation of Labor, that we deprecate the practice referred to, and urge upon the school authorities of the country that they direct their efforts at Vocational training to the end that the students who come out of the schools will have obtained information that will be useful and of assistance when the boy or girl comes to enter upon the duties of life. To this end, we urgently recommend that members of organized labor everywhere, give such attention as is needed to the experiments that are being made thruout the country to establish Vocational training in connection with the public school systems, to the end that the special studies and training to be thus afforded are practical and serviceable, and not a mere smattering of general knowledge that cannot be definitely applied when the student comes to take up the real work of life."

THOUGHTS ON INDUSTRIAL EDUCATION.

THE following are extracts from an address by Supt. W. W. Thomas of Springfield, Mo., delivered at the Missouri State Teachers' Association in St. Louis:

"If education is regarded as the avenue out of industry and into an easy place, into unaccustomed elegance and pleasant prominence it is most vicious, and detrimental to society.

"If education is sought as a means of developing power to work efficiently, to perform worthy tasks otherwise impossible, to lay a larger gift on the altar of human happiness, to pay a larger portion of the debt each individual owes to humanity, to do and to be all that in him lies for the benefit of the race, then the pursuit of an education is a succession of pilgrimages to Mecca.

"This kind of education, however, becomes essentially subjective rather than objective, unfolding of personality rather than acquisition of information, a developing of the *head* and the *heart* and the *hand* rather than an acquiring of reading and writing and arithmetic, emphasizing the three "h's" rather than the three "r's."

"Informational subjects are not ends in education, but means. The question of real importance is: What effect has the school in the way of developing the pupil?

"If you wish the pupil to be a conqueror in the campaign, see that he is a victor in every battle. Put before him a definite program of tasks, the first lying just before him, and within his power, and other tasks stretching away into all that he can do.

"The important thing is somehow to awaken the soul of the pupil to a vision of something *worth while*, that *he*

can do, and then impress upon him that the thing that he can do is worth while.

"Stir in him aspirations that are attainable and that are permanent because they are attainable. Show him that he has a place in the world that only he can fill.

"How many are kept from doing what they might do well, by an insane desire, created in the school, to do something which they cannot do at all!

"As far as possible, education should stress the new humanism, which emphasizes more than formerly the relations of man to other men. New realizations of the needs of society change the aristocratic ideal of culture into the democratic ideal of efficiency and service."

CRITICIZES MANUAL TRAINING WORK.

MANUAL training and domestic science as taught in the schools of Pennsylvania are criticized for their weaknesses by State Superintendent of Public Instruction N. C. Schaeffer in his annual report issued January first.

"From our observation of the Manual Training work," writes Dr. Schaeffer, "we are convinced that a large percentage of it is not as valuable as it should be. This is due to several causes, among which one may mention the training of the teachers and the lack of a definite idea as to the real function of Manual Training in the public schools.

"Too few of the teachers of Manual Training have had actual experience with industrial conditions. In some instances the exercises are abstract and have no definite relation to everyday experiences of the boy. In other cases the work is too mechanical. The designing is done by the teacher, while the pupil takes the idea which is handed to him and constructs an article which is not his in every sense of the word. Too much attention is paid in some instances to exhibition work."

Doctor Schaeffer says that in order to assist the teachers of Manual Training and to make clear "what we believe to be the real function of Manual Training—to give the boy a variety of experiences before he reaches the age of 14 or 16, so that when he reaches a point where he must make a decision as to his life's occupation he will have a background to draw from which will better enable him to make an intelligent choice—the department is preparing a pamphlet which will contain not less than six different Manual Training courses."

In discussing the weak points of domestic science, as taught in some of the Pennsylvania schools, Doctor Schaeffer says: "The number of school districts which are offering Domestic Science courses is gradually increasing. The Domestic Science course in order to be of service to the community should reach the large group which leaves school at the age of 14. Unfortunately, some work given is of such character as to be of little profit to the child. Too much attention is paid to the preparation of dainties and unseasonable food and not enough to the preparation of plain substantial foods. In many instances too little time is spent on this practical work.

"Many teachers have had no actual experience in the home and are dependent entirely upon the information they secured while in a Domestic Science school; other teachers have sought to fit themselves for teaching Domestic Science by taking a twelve weeks' course."

WESTERN NEW YORK VOCATIONAL TEACHERS' ASSOCIATION.

The Western New York Vocational Teachers' Association is an outgrowth of the Buffalo-Rochester Vocational Conferences called by Mr. Louis A. Wilson, specialist in Industrial Education, under the Division of Vocational Schools of the New York State Department of Education. The Association was formed at Buffalo, April 27, 1913, and its membership is open to all teachers in vocational subjects, including sewing, domestic science and manual training of Western New York. Mr. Francis H. Wing, Director of Manual Training and Vocational Schools of Buffalo, is president and Mr. Frederick P. Martin, Director of Manual Training at Kane, Pa. (formerly of Jamestown, N. Y.) is secretary.

The first semi-annual meeting of the association was held Jan. 16-17, 1914, at Buffalo. A strong program was presented before the general session and section meetings were held by the teachers of Manual Training, Vocational Bookwork, Vocational and High-School Shopwork and Home Economics. The conference opened with a dinner at the Hotel Statler on Friday evening, Jan. 16. Mr. Francis H. Wing, the toastmaster, in his introductory remarks, said that the schools must work for community efficiency and this theme was elaborated upon by the speakers who followed.

Mr. Warren W. Zurbrick, secretary of the Vocational Guidance Association of the Buffalo Public Schools, outlined the function of Vocational Guidance in the following words: "Vocational Guidance forms a background for the selection of a vocation by the individual. It is not an employment bureau, and in no case should it dictate the choice of a vocation. It should bring the facts concerning the vocations to the attention of young people and counsel with them as to their capabilities, but the ultimate choice should be left to the individual."

Mr. Arthur D. Dean, chief of the Division of Vocational Schools of the New York Education Department, was the next speaker, having for his topic "Where Do We Come Out?" He humorously remarked that there were so many phases of the presentday Industrial School problem that the above topic was the result of dire extremity, after searching for a subject upon which he could speak with *absolute confidence*. Mr. Dean dwelt at length upon the difficulty of adapting general industrial courses to the needs of the individual because of the many intricate problems presented by industry and commended the "short unit" course as worked out in the Buffalo Technical High School Evening Classes as best fitting the needs of the young worker. He also spoke of the good work being done by the high schools of agriculture because they bring vocational instruction to its direct point of application. Taking a look into the future, Mr. Dean prophesied that the worker would become so hedged about by industrial processes, which are deadening to the moral nature, that a lessening of the hours of labor would result and then it would be necessary to educate the worker for leisure as well as industry. With the improvements in machinery and the systematization of industry, it will then be possible to earn as much in five hours as now in ten.

Mr. Dean deplored the tendency of teachers and students to work for credits instead of for permanent educational results. He said that the products of our Vocational classes often showed poor technique which was wrong for the reason that a Vocational school should train for the best technical results whereby a manual training school aims to develop the individual pupil regardless of absolute perfection of technic.

Mr. Arthur Harrell, Principal of the Buffalo Technical High School, presented a paper upon "Unit Courses in Evening Schools." He said that these courses had been very successful during the present year in his school. More students were attracted to the evening school because they could pursue the exact line of study they desired without spending the time required in longer and more general courses. He maintained that the "unit course" was a product of the revolt against the traditional evening-school course. Too much record and credit work befogs the mind of the student as to the real issues of education and makes him look only for credits. A reform, he said, should be brought about in this matter.

Mr. A. V. Bird, Principal of the Rochester Shop School, presented a paper upon "Psychological Methods in the School Shop," in which he showed the difference between real shop experience and "manufactured" or school

shop experience. In the first case, a boy loses his job as a penalty for poor work or infraction of the rules, while in the latter instance, he is marked down a few points on the school record and soon forgets the lesson this punishment ought to instill. An idea to obtain lodgment in the mind must find expression and that its further use depends upon its being called into use by association, thus requiring a rich thought content in the work of the school shop and our theory of correlation is given a foundation in fact in the Manual Training Shop.

Mr. Stewart F. Ball, of the Department of Manual Training of Buffalo, read a paper upon "The Adaptation of Manual Training to the Individual and to the Community." The main points brought out in this paper and in the discussion which followed were more time and better technique for manual training classes, a greater number of materials should be used, pupils should be led to work out their own ideas and some effort made to find the individual vocational bent as an aid to Vocational Guidance.

"What are the Modern Demands of Manual Training and How Are They to be Met," was the subject of a paper by Mr. R. C. Keople of Rochester. The discussion of the paper brought out the facts that Manual Training needed more time, a better technique and more consideration as a pre-vocational agent. The prevailing sentiment of the speakers seemed to indicate that it would be necessary to educate the public as to the value of Manual Training as a part of the general school course and to this end publicity committees and closer state supervision were favored.

In the Vocational Bookwork Teachers' Section, Mr. W. A. Ward, of the Rochester Shop School, read a paper upon "Correlated Bookwork Subjects—Drawing, Mathematics and Science," and Mr. S. King, of the Peckham Vocational School of Buffalo, discussed the "Correlation of English, Geography, History and Citizenship."

The Vocational and Technical High School Shop teachers discussed the subjects of "Shop Habits Valuable to Industry," under the leadership of Mr. E. T. Welsh, of the Buffalo School of Printing and Shop Methods, following a paper by Mr. C. S. Newman, of the Rochester Shop School.

The Home Economics Section presented a strong program concerning the following topics: "The Wage Earner"—To develop traits of character essential to her success, what specific training can we offer? (a) In the cooking lesson, (b) in the sewing lesson, (c) in the salesmanship lesson. "The Home Maker"—From the experiences of the wage-earning period preceding her marriage, what definite preparation can be made to secure the best reaction on her career in the home (a) by the Domestic Art instructor, (b) by the Domestic Science instructor.

NEWS AND NOTES FROM THE FIELD

NEW YORK, N. Y. A one-year course in tanning has been established at Pratt Institute for the benefit of employes in the tanning industries and for students in the high schools who are interested in the work. The course has been begun thru the co-operation of the National Association of Tanners.

NORMAL, ILL. Two new courses in art metal and costume design have been added to the high-school curriculum. The former includes work in metals, principally in copper and brass, and the different processes of etching, raising, etc.

Classes in costume design are taught the general principles of the subject, including the working up of designs and making a study of them.

ACTING upon the suggestion of students in the Manual Training department of the public schools, the Portland, Ore., Commercial Club has recommended that the board of education purchase material for the Manual Training classes in large quantities. It has been found that the pupils in these classes purchase small lots of material as needed and in consequence they are obliged to pay high prices. It has been suggested that a large stock be kept on hand and sold in small quantities at as near cost price as possible.

JUNEAU, ALASKA, during the past school term, has taken a step toward advanced methods in education thru the introduction of various new courses in the public schools.

New courses in Domestic Science and business methods have been provided. The teaching force has been doubled by reason of these studies and the attendance has similarly increased. In the grades there is already a good course in Manual Training.

PORTLAND, ORE. Boy students in the Manual Training department of the Jefferson high school recently completed in the school workrooms several pieces of furniture including desks, chairs and tables. Oak book racks of excellent construction were presented to the superintendent and his assistants.

The work in the Manual Training department is closely correlated with academic activities and the boys are shown where their study of mathematics, English and science may be applied to the problems of the trades. The instruction is on broad, general lines with little attempt at teaching the essentials of a trade.

In addition to the actual work of the department, the instructors have organized an employment bureau to enable boys to earn their way while in attendance at the school and to secure employment for them after graduation. The results of the school have been so satisfactory that several large firms offer to take all the graduates which the school authorities recommend.

THE school authorities of Beloit, Wis., have begun a survey of trade opportunities with a view of introducing these industrial subjects in the high school. It is expected that the initial classes will consist of patternmaking and printing for the boys and dressmaking for the girls.

FOLLOWING the success of the first unit course in the Orville Beach Manual Training School, the industrial board of education of Oshkosh, Wis., has added several others of the same nature. The first course consisted of six lessons in saw filing.

The new courses will each consist of six lessons and will include tool dressing and welding, tracing in making blueprints, the use of wood stains and wood finishing and the making of patterns in the cutting of garments. The courses are along practical lines and it is expected that a good deal of useful knowledge will be possible.

SCRANTON, PA. The first step toward the establishment of an Industrial School has been taken with the opening of a room in the Manual Training Department of the English high school for this purpose. The school is intended for the benefit of boys and girls over 14 years of age who are by the provisions of the compulsory attendance law prohibited from working, but who because of withdrawal from school, are in need of assistance.

BATTLE CREEK, MICH. The first step toward the introduction of Industrial Education in the schools has been taken recently by the board of education. The board has

appointed a committee of three persons, including the president, one member of that body and a citizen, to study the need and the opportunities for industrial training. The committee is charged with the duty of evolving a plan of study which shall be adapted to the local needs, to obtain an estimate of the cost of buildings and necessary equipment, the cost of operation and a suitable method of collecting funds. The report of the committee is to be presented to the board on or before the first board meeting in April.

THE CHAMBER OF COMMERCE OF ROCHESTER, N. Y., in co-operation with the board of education and the owners of local machine shops, has devised a plan for giving part-time instruction to boys who desire to learn the machinist trade.

The plan provides a two-year course for those who have finished the grades, half of the time to be spent in shop practice. The subjects include mathematics, mechanical drawing, applied science, industrial history, civics, English and shop practice.

After completion of the course the boys may be employed for a period of two years as apprentices. During this time they are to continue their school work and will be paid $9 a week for the first six months of their employment. For the next half-year they will receive $10 per week, for the third half-year $11 and for the fourth half-year $12.

AN advisory committee of fifteen members has been appointed by the board of education of Minneapolis, Minn., to formulate a program which shall prepare children of the city for active work. It is expected that some form of Vocational training will be added to the school curriculum as a result of the work of this committee.

The committee in its study, will seek to learn the local conditions in so far as they relate to the education of the pupils in the schools, and the opportunities and needs of those who contemplate entering some business or industry as a life work. The committee will collect its findings and make suggestions to the board for developing the efficiency of students.

CINCINNATI, O. A co-operative course in millinery has been begun in the Woodward high school providing alternate work in school and shop. It is expected that the combination of academic subjects and actual shop work will give more practical experience than could otherwise be obtained. The girls will receive a wage of $5 per week during the time they are in the millinery workroom.

RIVERTON, N. J. Following a meeting of parents and school authorities in the school auditorium, plans for the extension and improvement of the industrial training courses have been made.

A NEW feature of the domestic arts department of the School of Agriculture at Minneapolis, Minn., is the course in practical arrangement and improvement of homes. Each girl is required to make a rough sketch of her own home. The sketches are then taken to class and scanned by the class. An effort is made to determine what changes might improve the appearance of the rooms or make for a saving of labor for the housewife. After the plan has been studied by the class, the girls are required to make new sketches embodying the improvements, without increasing the cost of the same. Simplicity and convenience are the guiding principles of the instruction.

THE ninth annual free classes in cartooning, illustration, sketching and design have opened at the Chicago Academy of Fine Arts under the direction of Carl N. Wertz. The classes are limited to public school children between the ages of 13 and 18 to the number of one hundred. The instruction includes Vocational subjects in art.

THE second term of the free course in proof-reading and typography at the Stuyvesant Evening Trade School in New York City has begun. The classes are open to job compositors, linotype operators, monotype operators, proof-readers and others engaged in the trade.

LAFAYETTE, IND. Local manufacturers and business men have recently given facilities for the establishment of a vocational school in the high school building. It is planned to teach printing, painting, bookbinding, machine operation, drafting and carpentering. A salesmanship course has been in operation during the year.

COLUMBUS, O. Continuation classes have been planned by the board of education and the local department stores for the training of employed boys and girls in the stores.

ST. JOSEPH, MO. Acting upon the suggestion of President Carroll Connett, the school board has taken steps to convert the Robideaux school into an industrial and commercial high school.

WASHINGTON, D. C. Thru the efforts of a joint committee of members of the local Board of Trade, Chamber of Commerce and Retail Merchants' Association, a Vocational guidance bureau has been opened with Mr. Gustav Blumenthal in charge.

MUNCIE, IND. Since the opening of the second semester at the high school, classes in Household Chemistry and Elementary Science have been in operation. The Household Chemistry class has been designed for girls who will pursue the instruction as a foundation for the work in Domestic Science. The students are expected to analyze different foods, make tests for the presence of adulterants and become familiar with the best methods for sanitation in cooking and household work.

HARTFORD, CONN. The high-school committee of the board of education has taken steps to open an evening Continuation school for girls. The course will consist of one session each week for two years and will include English, Sewing and laundry work, hygiene and Cooking in the first year; and English, mathematics, Sewing, home management, industrial and commercial geography, history and Cooking in the second year.

ANDERSON, IND. The spring term of the local Industrial school opened with an enrollment of 200 students. The main school has an enrollment of over one hundred and courses are offered in Woodworking for the boys and Domestic Science for the girls.

LIMA, O. The making of desks for the new rooms of the west wing of the high school has been recently undertaken by the boys in the Manual Training department. The desks are to be in the mission style and will follow models made by the students.

FIGURES recently submitted by Miss Rita Johnson, principal of the Nicholls Industrial School at New Orleans, La., indicate that the operation of the several departments has been accomplished at a profit thru the sale of the articles made by the students.

The profits, as estimated, for the dressmaking department amounted to $83.53; for the millinery department, $19.04; for the domestic science department, $9.96 and for the arts and design departments, $3.05. The total profit was $112.52.

NEW LONDON, CONN. Steps will be taken shortly to investigate the needs and advantages of the city as the possible location for a trade school. The establishment of such a school has been authorized by the general assembly of the state and is sought as an extension of the present Manual Training School.

LA CROSSE, WIS. The Domestic Science course in the high school has been increased from five periods to ten periods a week. Two periods each day are now given to this subject. The change was made upon the advice of the state authorities in order to insure the requisite aid from the state.

MANKATO, MINN. A Commercial department has been established in the high school.

BOYERTOWN, PA. The school board has opened a Manual Training class in the high school with an enrollment of seventeen students.

BAY CITY, MICH. The school board has received two petitions from parochial schools for admittance of students to the classes in Manual Training in the public schools. In one case the parochial school authorities ask that the pupils be allowed to enter the classes in the public schools and in the other case they ask for the loan of the instructors. In the latter case the equipment is provided but there are no teachers available.

DOWAGIAC, MICH. The study of Agriculture has been introduced in the high school and a special instructor appointed. The aim of the course will be to make students of farmers rather than to provide a vocation for students, and the instruction will be based on the theory as well as the practice of the study. Laboratory work will be required as well as book instruction in soils, surveying, spraying, grafting, pruning, etc.

WATERLOO, IA. A class in gas engine work has been started in the night trades school of the East high school. The enrollment has reached nine students.

ABERDEEN, S. D. The study of Agriculture has been pursued by the students in the public schools and high school since the beginning of the second semester. In the grades the children are urged to prepare home gardens under the supervision and advice of the instructors. Several school gardens are contemplated and the testing of seeds, the best manner of planting and practical demonstrations with plants and indoor experiments will receive attention.

In the high school, a definite four-year course is outlined. The first year's work consists of a study of field crops; second year, farm animals; third year, first semester, farm mechanics and second semester, farm accounting; fourth year, soils.

THE Sewing classes in Central School, Hammond, Ind., have assumed the responsibility of furnishing the clothing for four kindergarten children who come from poor families. They furnish a part of the clothing for a number of other children. The girls take their worn out and outgrown clothing to school, rip it apart, wash the cloth and make it into clothing for the little folks. All remnants and "scraps" left from class exercises are utilized in the same manner. During the present school year, the classes have made 20 garments for the smaller children, in addition to the regular classwork. The clothing consists of dresses, petticoats and underwear. The classes are taught by Miss Frances Allen.

SELF-SUPPORTING students filled more than 1300 positions during the past year, according to the annual report of the bureau of employment of the University of Chicago. A total of $109,604 was earned making the average per student something over $83. Positions as waiters, stenographers, salesmen and janitors were those most frequently filled, but for the student with more particular talents there were places that paid from $2 to $25 a day.

THE VOCATIONAL SCHOOLS DIVISION OF THE UNIVERSITY OF THE STATE OF NEW YORK has arranged for nine vocational conferences to be held at various times in different places in the State as follows: Dec. 6, in Albany; Jan. 10, in Elmira; Jan. 17, in Buffalo; Jan. 24, in Yonkers; Feb. 7, in Utica; Feb. 28, in Troy; March 14, in Waverly; April 11, in Rochester; April 18, in Mt. Vernon.

The object of the vocational conferences is to develop a spirit of co-operation and helpfulness among the vocational teachers of the State and bring to their attention that which is best in educational thought pertaining to Vocational Teaching.

SAN JOSE, CAL. Acting upon the suggestion of Supt. Alexander Sherriffs and Principal C. M. Osenbaugh, the school board has recently approved the plan to introduce an Agricultural course in the high school.

PUPILS in the A eighth grade of the public schools of St. Paul, Minn., before graduation from the cooking classes are required to pass an examination. The test consists of the planning, preparing and serving of a menu selected by the pupils which can be prepared at the lowest cost.

As an example of what the girls in this department are capable of performing, nineteen girls of the Lincoln school prepared and served a three-course luncheon at twenty cents per plate. The planning, buying of the material, preparation and serving of the food was carried out by the girls under the supervision of the instructor.

The menu consisted of the following: First course, cream of tomato soup with croutons; second course, meat loaf, potato croquettes, creamed peas, baking powder biscuits, butter, jelly, pear pickles; third course, caramel ice cream, peanut cookies, coffee.

PERSONAL NEWS NOTES.

RICHARD ERNESTI, director of the Art Department at the Colorado State Teachers' College, Greeley, has resigned after ten years of service, to become head of the Industrial Art Department of the Pennsylvania State College.

NASHVILLE, TENN. Mr. M. W. Robinson has been appointed Supervisor of Industrial Work for the high schools of Tennessee.

MR. WILLIAM L. ANDERSON, of the Dorchester high school, has been appointed to the position of assistant director of evening and Continuation schools in Boston, Mass. The salary has been fixed at $3,000 per year.

MR. FRANK M. KARNES, formerly supervisor of Manual Training in the public schools at Kenosha, Wis., has recently become supervisor of Industrial work at the State Normal School, Oshkosh, Wis.

MR. A. E. LOGAN, formerly assistant instructor in the manual training department of the high school at Columbus, Ind., has been elected superintendent of schools at Riley in that state.

MISS LOUISE WEAVER, formerly special teacher of Domestic Art at Des Moines, Ia., has resigned to accept the position of director of Home Economics at Highland Park College, Des Moines.

MR. OTTO J. ROWEN, formerly instructor in Manual Training in the high school at Flint, Mich., has been appointed to a similar position at Winona, Minn.

MR. ELMER W. FREEMAN, formerly head of the wood-pattern department of the Deere Harvester Company, East Moline, Ill., has been appointed instructor at the Manual Arts School at Moline. Mr. Freeman's duties will include the instruction of all eighth-grade classes in Manual Training.

MISS GERTRUDE BASSETT, teacher of Domestic Science in the Northwestern University Settlement, died last month. Miss Bassett was the daughter of Rev. Geo. M. Bassett, assistant superintendent of the Presbyterian Hospital, Chicago.

The funeral took place at St. Paul's Methodist Episcopal Church and the remains were cremated.

NEW LONDON, CONN. A class in domestic science for grammar-school students over 12 years of age has been organized. The class was begun for the benefit of girls who are not likely to enter either of the two domestic arts schools in the city. Sessions will be held once each week for a period of 90 minutes.

BOOK REVIEWS

Soils and Crops.

By Thomas Forsyth Hunt and Charles William Burkett. 550 pages. Price, $1.50. Orange Judd Company, N. Y.

This is a text for pupils of high-school age. The authors have undertaken to put the fundamental facts of elementary Agriculture into such form as to make them thoroly teachable. Not only have they given an abundance of information concerning the science of Agriculture, but they have clearly taken great care in the preparation and arrangement of material from the standpoints of both pupils and teacher.

The book is intended for sixteen weeks of study, and contains 48 lessons arranged in logical order. Each lesson is devoted to one general idea and is divided into fifteen paragraphs which carry out the principle of leading the pupil from the simple and concrete to the complex and abstract.

With its pedagogical treatment, its abundance of authoritative material, and its numerous illustrations this text would seem to merit extensive use by those interested in the teaching of Agriculture.

Industrial Chemistry for Engineering Students.

By Henry K. Benson. 450 pages. Price, $1.90. The Macmillan Company, New York, N. Y.

The purpose of this book, as stated in the preface, is to describe from the standpoint of chemistry, the more common materials used in the various branches of engineering. Emphasis is accordingly laid upon the occurrence, the mode of manufacture, the properties, and to a limited extent, the uses of the various materials.

The text is an elaboration of lectures, given by the author to second-year engineering students in the University of Washington. It presupposes a knowledge of elementary physics and general chemistry.

The subjects discussed are the manufacture of pig iron, wrought iron and steel; alloys, clay products, cement and lime products, paving materials and wood preservation, paint and varnish materials, electrical insulation, cellulose products and explosive materials. A bibliography of the subject discussed, is given at the close of each chapter.

Heraldry for Craftsmen and Designers.

By W. H. St. John Hope. 426 pages. Price, $2.25. The Macmillan Company, New York.

"The Artistic Craft Series of Technical Handbooks." This splendid collection of heraldic design is a valuable addition to the increasing fund of information and material common to the arts.

It contains 31 full-page plates, several of which are in full colors, in addition to 199 text illustrations.

This text, by W. H. St. John Hope, is a clear statement of the principles of the art of Heraldry. Aside from the value of the book in presenting a comprehensive guide to the application of heraldic design in the applied arts, it has a distinct value as presenting thru its profuse illustration, the best examples of a class of design and drawing that is simple and effective.

The composition and drawing of these symbols is well worth study independent of their meaning. Drawing and design are never more purposeful than when carried thru long periods of development and use, and many of these examples of heraldry are gems of artistic expression. The book will serve a very definite need.

Consular Reports on Industrial Education in Germany.

Bulletin of the United States Bureau of Education, No. 54. Whole number 565.

This bulletin contains the consular reports on the German System of Industrial Education and German Schools for Builders by Ralph Busser, American Consul at Erfurt; Preparatory Courses for Master Craftsmen, by George Nicholas Ifft, American Consul at Nuremberg; Courses for Master Tradesmen at Frankfort-on-the-Main, by Vice Consul General William Dawson, Jr., at Frankfort-on-the-Main; Brief Report of the Trade Institute at Cologne, by W. G. Dunlop, American Consul at Cologne; and Schools for Fruit Growing, by Consul General H. W. Harris at Frankfort-on-the-Main.

These reports are quite complete giving tuition, expenses, and the subject matter of many of the courses.

PROCEEDINGS OF THE FIRST INSTITUTE OF THE CONTINUATION SCHOOL TEACHERS OF WISCONSIN, held at Madison, Sept. 15, 16, and 17, 1913. Bulletin of the Wisconsin State Board of Industrial Education, No. 8. This report is worthy of considerable study by every student of Industrial Education. It is a document of 257 pages showing what is being done in a progressive state to meet the conditions as they exist.

It contains an introductory statement and a summary of statistics by Warren E. Hicks, State Superintendent of Industrial Education, and an outline of Extension Courses offered by the University of Wisconsin, in addition to a stenographic report of the Institute.

THE FITCHBURG PLAN OF CO-OPERATIVE INDUSTRIAL EDUCATION. United States Bureau of Education, Bulletin, 1913, No. 50.

VOCATIONAL EDUCATION, Rochester, N. Y. Public Schools, 1913. Reprinted from the Fifty-Sixth Report of the Board of Education.

ANNUAL REPORT OF THE PUBLIC CONTINUATION SCHOOLS OF WISCONSIN. Bulletin of the Wisconsin State Board of Industrial Education, No. 7. Prepared by Warren E. Hicks, Assistant Superintendent for Industrial Education.

PROCEEDINGS OF THE HOME COMING at the Tenth Anniversary of the College of Industrial Arts, Denton, Texas.

OCCASIONAL SUGGESTIONS is a little magazine published weekly during the school year by the Worcester Trade Schools, Worcester, Mass. It consists "of thoughts which are always old but which will bear re-telling to youth. The old have read them before, but then, who is old?"

WESTERN DRAWING AND MANUAL TRAINING ASSOCIATION.

The twenty-first annual meeting of the Western Drawing and Manual Training Association will be held in Milwaukee, May 6th to 9th. The Plankinton Hotel will be the Headquarters. The exhibits, both educational and commercial, will be placed in the arena of the Auditorium. The meetings of the Association will be held in the Convention halls, located in the same building.

Milwaukee is an ideal city for this meeting. It is centrally located, has excellent railroad facilities, an immense building for the exhibits and meetings, and a wonderful educational system, worthy of study and emulation.

The general topic of the program will be "a casting of accounts, educationally, for the Fine and Industrial Arts; a re-statement of the faith that is in us." The program is prepared especially for the younger members. The Round Tables will not be limited to the general topic. Several well known speakers have been engaged, and the meeting promises to be a great success.

The Local Committee is making arrangements to place and care for an unusually large exhibit. Miss Emily Dorn is Chairman of the Local Committee.

NOW, ARE THERE ANY QUESTIONS?

Readers are urged to ask questions concerning the Industrial Arts. The editors will reply to those questions which they feel that they can answer, and to other questions, they will obtain replies from persons who can answer them authoritatively. Questions should be addressed to THE EDITORS.

A Simple Fume Box.

Chicago, Ill. Q:—Please describe a simple method of fuming oak which may be used in a school shop.

A:—The following method has been used with complete success: A framework for a fuming box seven feet long, three feet high, and three feet wide, was made of light material and covered with oil cloth. Two ropes were tied to the top of this box and put thru two pulleys attached to the ceiling.

A number of small pieces of cabinetwork were placed together in such a way that they might be covered with the box. Two or three pans of strong ammonia, "borrowed" from the chemistry department were placed on the floor and the box lowered over cabinets and ammonia. Cabinets made of white oak or chestnut were colored a beautiful brown after 48 hours in the box.

Red oak may be fumed if it is first treated with a solution of tannic acid. Tannic acid will not dissolve readily in water, but it will dissolve quite readily in glycerine. The glycerine will then dissolve readily in alcohol. If the red oak is treated to a coat of this solution, the ammonia fumes will act on it. After taking the furniture from the fuming box, the color may be darkened by rubbing with linseed oil.

The box may be drawn up to the ceiling when not in use.—*W. H. H.*

Washing Up Presses.

Oklahoma City, Okla. Q:—Which is better to use in washing up a press, benzine or kerosene? What is best to use to keep the rollers in good condition?

A:—Benzine is generally used. There is a difference of opinion as to the comparative effects on the rollers. Benzine tends to make the surface dry and hard, while some claim that kerosene makes the roller composition "go to pieces" sooner.

My own plan is to use benzine for a quick wash up to change inks. At night, however, I leave the ink on the press, pouring a little lubricating oil on the disc and running the press until the oil is thoroly spread over disc and rollers. Next morning I wipe off the ink and oil with a dry cloth or one slightly moistened with benzine. This always leaves the rollers perfectly pliable, and to my mind it is the best method of preserving them. Of course, there are some inks which should not be left over night, such as bronze blue and red.—*S. J. V.*

Loosening Type.

Joliet, Ill. Q:—How would you loosen and clean a mass of type which has been left with ink on it, until it has stuck solidly together?

A:—Make a strong solution of lye and saturate the mass of type with it. Rub the lye in thoroly with a printer's scrub brush. Leave the lye on the type two hours and then rinse in water. Keep repeating this process until the type is loosened and cleaned.—*S. J. V.*

Jewelry Tools.

Columbus, O. Q:—Where can I buy the tools for doing the jewelry work described by Mr. Sorensen?

A:—Orr & Lockett, Chicago, Henry Paulson, Chicago, Belcher & Loomis, Providence R. I. For the accommodation of those who are interested in the work I am describing, I should be willing to select the tools and ship them as cheaply as they can be had on the market.—*H. R. Sorensen.*

Plating Silver.

Emporia, Kan. Q:—Could you gold plate silver? How?

A:—I could, but I wouldn't. Gold plating is a simple process, but to describe the making of the apparatus would require considerable space. The whole matter will be fully explained in an early number of the Industrial Arts Magazine.—*H. R. Sorensen.*

Construction Work.

Elizabeth, N. J. Q:—What do you consider the best constructive work for the lower grades?

A:—We give the children in our Training School bookmaking, clay modeling and weaving. We put much more time on the bookmaking. See picture at bottom of this page.—*S. J. V.*

Gilt Edging Books.

Cleveland, O. Q:—Will you please describe the process of putting gold leaf on the edge of books?

A:—This is a somewhat intricate process and we have arranged with a gilder in one of the large binderies to describe the process fully in our next number.

Scrapbooks made and filled with pictures by the children of the first four grades of the Northern Illinois State Normal Training School, DeKalb. The books were sent last Christmas to Miss Mary McDowell, of the Chicago University Settlement, and were distributed among the children there.